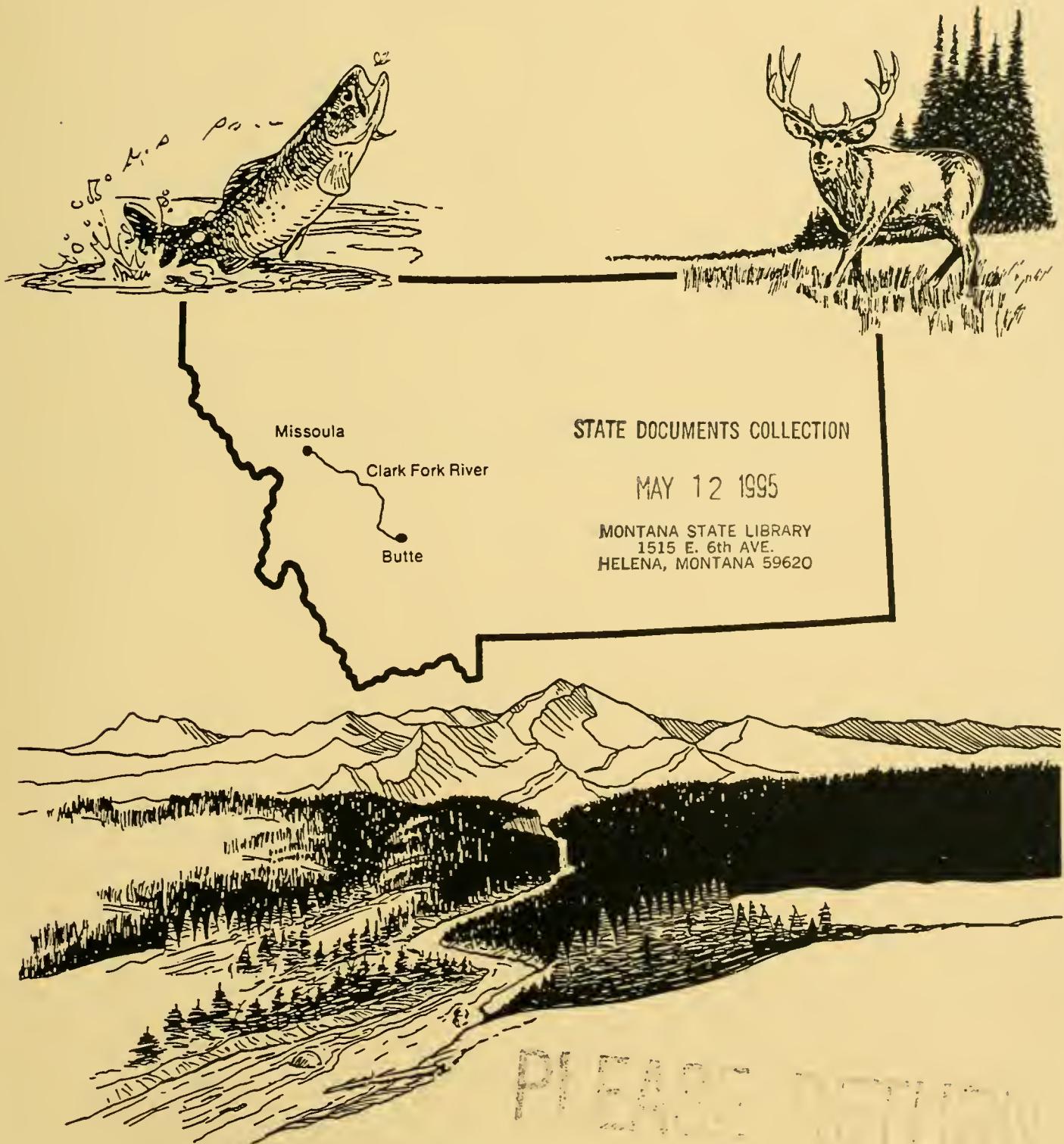


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STATE OF MONTANA
NATURAL RESOURCE DAMAGE PROGRAM

RESPONSES TO COMMENTS TO ASSESSMENT PLAN
CLARK FORK RIVER BASIN NPL SITES

JANUARY 1995



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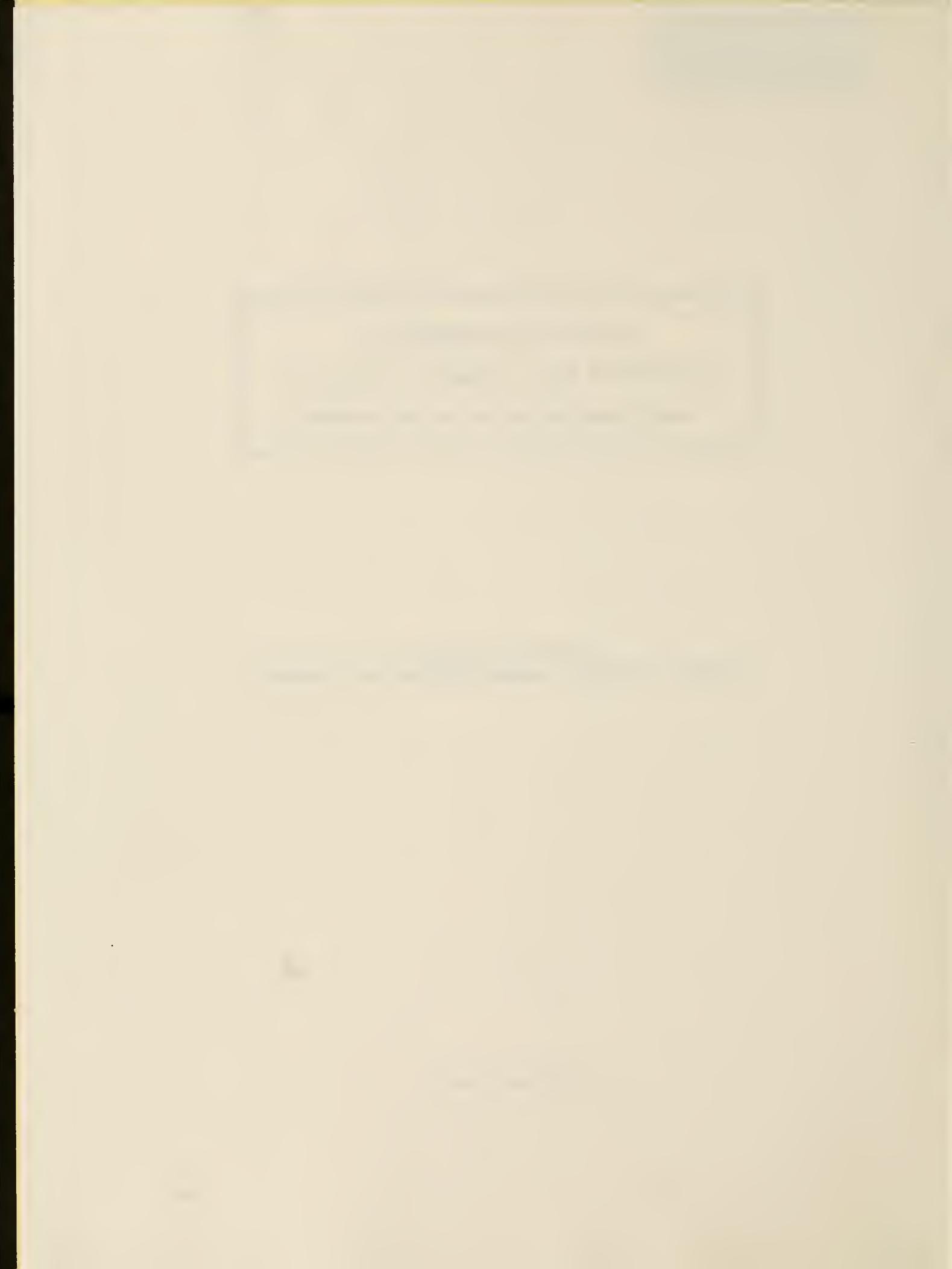


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**RESPONSE TO COMMENTS ON
ASSESSMENT PLAN: PARTS I, II & III
CLARK FORK BASIN NPL SITES, MONTANA**

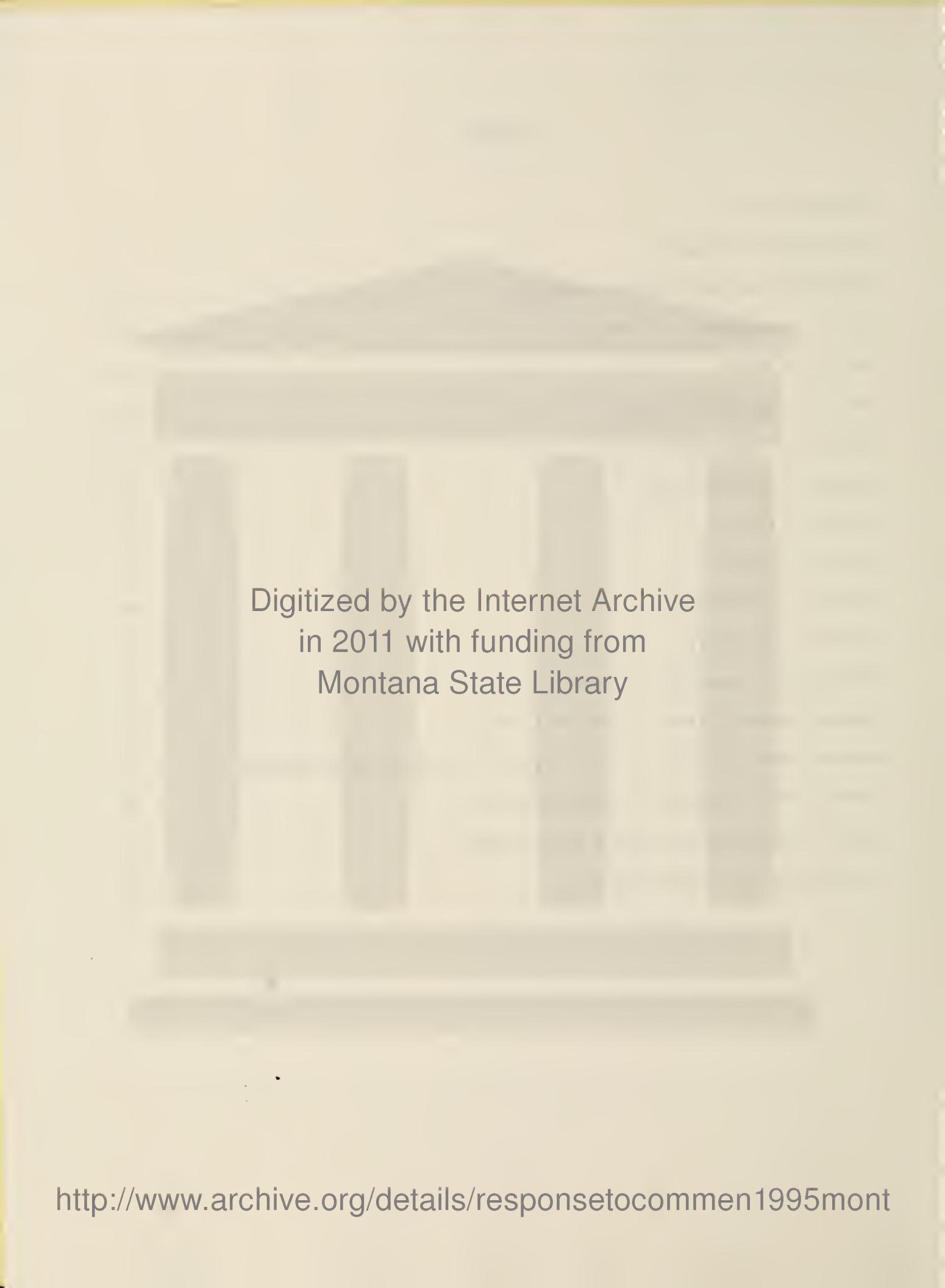
**STATE OF MONTANA
NATURAL RESOURCE DAMAGE LITIGATION PROGRAM**

JANUARY 1995



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A very faint, large watermark-like image of a classical building with four columns and a triangular pediment occupies the background of the page.

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Introduction

This response to comments volume of the Report of Assessment is prepared in accordance with Department of Interior (DOI) regulations setting forth requirements for the conduct of natural resource damage assessments. Specifically, 43 C.F.R. § 11.90 requires that public comments and responses to these comments be included in the Report of Assessment.

A natural resource damage assessment is the method whereby a trustee for natural resources, such as the State of Montana in this instance, determines that natural resources have been injured by releases of hazardous substances and establishes the monetary damages due to the trustee arising from the injuries. A Report of Assessment is simply the documents that comprise the assessment, including public comments received during the course of the assessment and responses to those comments.

The assessment was prepared by the State of Montana in furtherance of its lawsuit against the Atlantic Richfield Company (ARCO). In this lawsuit the State is alleging that ARCO and its predecessors are liable for the extensive and severe injuries to natural resources in the Upper Clark Fork River Basin.

The history of the assessment process insofar as it relates to opportunities for public input is briefly set forth below. On October 10, 1991, pursuant to the DOI regulations, the State issued a "Preassessment Screen." The Preassessment Screen is used to determine whether there is sufficient justification to go forward with an assessment. The Preassessment Screen concluded:

- 1) that releases of hazardous substances had occurred,
- 2) that natural resources for which the State may assert trusteeship have been adversely affected by releases of hazardous substances,
- 3) that the releases of hazardous substances could potentially cause injury to natural resources subject to the State's trusteeship,
- 4) that data sufficient to perform an assessment are available or could be obtained at a reasonable cost, and

5) that response actions will not sufficiently remedy the injury to natural resources.

Based on the determinations in the Preassessment Screen, the State issued a "Notice of Intent to Perform an Assessment." In accordance with § 11.32(a)(2)(iii)(A) of the DOI regulations, the Notice invited ARCO to participate in the development and performance of the assessment and specifically provided ARCO with the opportunity to submit an assessment plan to the State. ARCO did not comment on, or otherwise respond to, the Notice. Rather, ARCO submitted written comments on the Preassessment Screen. Although the regulations do not require that the Preassessment Screen be made available for public comment, in light of ARCO's legitimate interest in this assessment, the State considered these comments by ARCO.

On January 17, 1992, the State issued its Assessment Plan, Part I, Clark Fork River Basin NPL Sites, Montana. Part I of the Plan identified the methodologies for conducting injury determination and quantification for surface water, fisheries, sediments and groundwater resources. Part I of the Plan was made available to ARCO, other interested parties, and the public for review and comment. Comments initially were requested to be submitted in writing by March 2, 1992. ARCO and other parties requested an extension of time to submit comments, and the State granted an extension to March 16, 1992. Comments were submitted by ARCO, the U.S. Environmental Protection Agency (U.S. EPA), the U.S. Department of the Interior (DOI), the Missoula City/County Health Department, the Clark Fork-Pend Oreille Coalition, and four individuals.

On April 24, 1992, the State issued its Assessment Plan, Part II. Part II of the Plan identified the methodologies for conducting injury determination and quantification for air, soil, vegetation and wildlife resources and the methodologies to be used for determining damages. Part II of the Plan also was made available to ARCO, other interested parties, and the public for review and comments. Comments initially were requested to be

submitted by June 1, 1992. ARCO and other interested parties requested an extension of time to submit comments, and the State granted an extension to July 1, 1992. Comments were submitted by ARCO, DOI, the Clark Fork-Pend Oreille Coalition, the Citizens Technical Environmental Committee (CTEC), and two individuals.

On June 8, 1994, the State issued its Assessment Plan, Part III. Part III of the Plan identified the methodologies for conducting further natural resource damage assessment work related to aquatic resources. Part III of the Plan was made available to ARCO, other interested parties, and the public for review and comments. Comments were submitted by ARCO and the Confederated Salish and Kootenai Tribes.

This response to comments volume is organized in the following manner: Comments on the Assessment Plan, Parts I and II, and response to those comments are aggregated. Comments on the Assessment Plan, Part III are identified and responded to separately. An Appendix includes the actual comments, including ARCO's comments on the Preassessment Screen.

Assessment Process

COMMENT: ARCO claimed that the State made no effort to comply with the DOI regulations. ARCO also claimed that the Assessment Plan was deficient in its entirety and that the assessment was not entitled to a rebuttable presumption.

RESPONSE: Compliance with the DOI regulations is not mandatory. Assessments conducted in accordance with the DOI regulations, however, shall have the effect of a rebuttal presumption in any judicial or administrative proceeding under CERCLA. 42 U.S.C. § 9607(f)(2)(C). The State believes it conducted the assessment in accordance with the DOI regulations. The DOI regulations provide objectives and criteria for selecting methodologies for making injury and damage determinations, but they do not provide specific procedures for implementing these methodologies. The DOI regulations establish a flexible rule that is necessary because of the multitude of resources, ecosystems, and

hazardous substances, as well as the need to allow the use of evolving scientific and economic methodologies. The DOI regulations seek a balance between controlling the potential costs of assessment and the need for flexibility in designing the assessment. 51 Fed. Reg. 27674, 27675 (1986). Accordingly, the DOI regulations repeatedly describe the procedures as providing "guidance." This includes the procedures for the preassessment screen, 43 C.F.R. § 11.23(d), the injury determination phase, including injury definition and pathway determination, 43 C.F.R. §§ 11.61(c) & 11.63(b), (c), (d), (e) & (f), testing and sampling methods, 43 C.F.R. §§ 11.62(a) & 11.64(a), the injury quantification phase, 43 C.F.R. §§ 11.70(a) & 11.72(g), (h), (i), (j) & (k), and the damage determination phase, 43 C.F.R. §§ 11.80(a)(1) & (c), 11.81(a), 11.82(d)(3)(ii)(B), 11.84(a) & 11.91(a). Thus, in conducting the assessment, the trustee must take certain actions, such as performing a preassessment screen and preparing an assessment plan. In taking these actions, however, the trustee must exercise its best judgment to apply the guidance provided by the regulations as appropriate to the particular assessment. Thus, the State implemented the guidance provided by the DOI regulations as appropriate in its best judgment to an NRDA for the Upper Clark Fork River Basin.

COMMENT: ARCO claimed that the Preassessment Screen was deficient and that it should be withdrawn and revised before the State could proceed with the assessment.

RESPONSE: In accordance with the DOI regulations, the Preassessment Screen was a rapid review of readily available information to determine whether a damage assessment should be performed. It was not a summary of all existing data, and it did not entail field activities. Its purpose was only to determine that there was a reasonable probability of making a successful claim before monies and efforts were expended in carrying out an assessment. 43 C.F.R. § 11.23(a). The Preassessment Screen concluded that there were releases of hazardous substances in

sufficient quantities and concentrations to potentially cause injury to natural resources for which the State could assert trusteeship. It further concluded that an assessment could be conducted at a reasonable cost and that the Superfund RI/FS process would not restore the natural resources. 43 C.F.R. § 11.23(e). These preliminary conclusions were the subject of further investigation and analysis by the assessment, and were subsequently confirmed.

Detailed findings and conclusions regarding injury determination are not required for a preassessment screen. For example, based on the information contained in a preassessment screen a determination must be made that the quantity and concentration of the released hazardous substance "is sufficient to potentially cause injury." 43 C.F.R. § 11.23(e)(3) (emphasis added). The decision to proceed beyond the screen need only be based upon a "preliminary finding" that the release "could have resulted in some injury." 51 Fed. Reg. 27678.

The preassessment screen need not determine the time, quantity, duration, and frequency of all of the releases of hazardous substances. Rather, the preassessment screen need only evaluate readily available information concerning the time, quantity, duration and frequency of the release in order to make a preliminary determination that a release has occurred that potentially caused injury to natural resources for which the State is trustee. 43 C.F.R. §§ 11.23(e) & 11.24(a).

COMMENT: ARCO commented that studies referenced in the Assessment Plan had already begun and that ARCO should not be held liable for costs from "poorly conceived studies."

RESPONSE: Selected studies were begun prior to publication of the Assessment Plan. This was indicated in the Plan. Initiation of some studies prior to release of the Plan was necessary in light of the schedule required by the Court and the length of time needed to complete the studies. Nonetheless, all studies set forth the Plan were evaluated upon the receipt of comments in order to

determine if sufficient cause existed to modify any part of the Assessment Plan.

The State agrees that ARCO should not be liable for the costs of performing "poorly conceived studies" but disagrees with the implication that the State's studies can be so characterized. No commenter provided sufficient grounds to cause the State to halt or modify one of the ongoing studies.

COMMENT: ARCO stated that the State did not have the authority to bifurcate the Assessment Plan into two parts.

RESPONSE: The DOI regulations do not require a complete plan to be issued at one time. The DOI regulations require an opportunity for review and comment of the assessment plan by the responsible party, other interested parties, and the public. The DOI regulations also specifically allow for modifications of a plan. 43 C.F.R. § 11.32(e). This clearly demonstrates that there may be more than one version of a plan.

COMMENT: ARCO generally stated that the Assessment Plan, including all of the research plans for injury determination and injury quantification, did not provide sufficient detail and were not shown to be cost-effective.

RESPONSE: The purpose of the Assessment Plan is to ensure that the assessment is performed in a planned and systematic manner and that the injury determination and quantification and damage determination methodologies can be conducted at a reasonable cost. 43 C.F.R. § 11.30(b). The assessment plan need be of sufficient detail to serve as a means of evaluating whether the approach for assessing damages is likely to be cost-effective and meet the definition of reasonable costs. 43 C.F.R. § 11.31(a)(2).

All available data and information need not be included in an assessment plan. The assessment plan should include descriptions of the natural resources and the geographical areas involved and certain sampling and other information. To the extent this information was available, it was included in the Assessment Plan.

To the extent this information subsequently became available, it is included in the Administrative Record. The Assessment Plan, by definition, did not contain the detailed findings and conclusions determined as a result of implementing the Plan.

The Assessment Plan was of sufficient detail to ensure that it would be carried out at a reasonable cost. Care was taken to coordinate the various phases of the assessment. The State chose to rely on methodologies that provided accurate calculations of damages but were not cost-effective. Finally, the Assessment Plan made it clear that given the likely scope and degree of injuries and anticipated damages in the Upper Clark Fork River Basin, the costs of the assessment would likely be far less than the damages.

Cost-effective means that when two or more activities provide the same or a similar level of benefits, the least costly activity providing that level of benefits is selected. 43 C.F.R. § 11.14(j). The detail contained in the Assessment Plan met this purpose. The State always chose the cost-effective method whenever such choices were presented. No commenter provided information demonstrating that the State chose studies and research plans that were not cost-effective.

COMMENT: ARCO commented that the scientific and economic methodologies identified in the Assessment Plan, particularly for pathway determination and injury determination and quantification, were insufficient because they did not specifically state that various factors listed in the DOI regulations would be considered.

RESPONSE: It was not necessary to specifically refer to the criteria identified in the regulations since it was made clear that the assessment was following the regulations. Thus, for example, Section 2.2 of Part I and Section 2.2 of Part II specifically indicate that the pathway determinations would be made in accordance with 43 C.F.R. § 11.63. In short, the State does not believe that it was necessary for the Assessment Plan to recite all the particularized language of the regulations.

COMMENT: One comment stated that additional information regarding sampling activities should be provided. ARCO also stated that the research plans were not sufficiently detailed regarding sampling activities and that the testing and sampling plans did not sufficiently identify their objectives.

RESPONSE: First, the State believes that the level of detail provided was adequate to allow for an evaluation of the Assessment Plan, Second, the information provided by the Assessment Plan regarding testing and sampling met the purposes of a Plan pursuant to the DOI regulations. 43 C.F.R. § 11.64(a)(2). Third, the objectives of the research plan for each natural resource were specifically discussed. See Sections 7.3.3, 7.4.3, and 7.5.3 of Part I and Sections 2.3.3 and 2.4.3 of Part II. The development of the objectives considered available information and data. Fourth, it should be noted that much of detail ostensibly lacking from the Assessment Plan can be found in the specific resource injury reports located elsewhere in the Report of Assessment.

COMMENT: ARCO commented that it was not afforded the opportunity to collect split samples.

RESPONSE: The State complied with the DOI regulations relating to the sharing of split samples, data and results of analyses. 43 C.F.R. § 11.31(a)(4). The State's efforts in this regard are set forth in the Assessment Plan, Part I, and subsequent correspondence with ARCO, which is part of the Administrative Record. ARCO was provided split samples of surface water, groundwater, soil, and vegetation samples. Samples of fish and wildlife tissues were also made available to the extent sufficient sample material existed.

COMMENT: Another comment asked how much notice the State provided to ARCO for opportunities to collect split samples.

RESPONSE: To the extent practical, the State provided ARCO with ten days' notice prior to sampling.

COMMENT: One comment stated that the sampling and data collection activities appeared to be confined to the four NPL sites.

RESPONSE: Sampling design and data collection protocols were in part based on the availability of existing data. A large portion of existing data was from Superfund RI/FS documents which, for the most part, pertain to the four NPL sites. Most of the impacted areas of the Upper Clark Fork River Basin are part of one of the NPL sites. In some instances the purpose of the NRDA data collection was to determine sources and pathways of hazardous substances, and therefore, the sample collection focused in the areas of the NPL sites. In other instances the purpose of the NRDA data collection was to determine the nature and extent of the injury, and therefore, the sample collection was not limited to the areas of the NPL sites. For example, surface water and sediment samples and fishery data collected as part of the NRDA are distributed throughout the Upper Clark Fork River Basin.

COMMENT: ARCO questioned whether the assessment could be completed at a reasonable cost.

RESPONSE: The DOI regulations provide that the term reasonable cost means that the NRDA is well coordinated, that the costs of performing more accurate tests and studies are less than the anticipated benefits from the added degree of accuracy, and that the anticipated costs of the assessment are expected to be less than the anticipated damage amount. 43 C.F.R. § 11.14(ee). Here, all of these criteria are met. And, while a determination of reasonable cost is forward-looking, the results of the assessment also demonstrate that the costs are reasonable. As indicated in the Report of the Assessment, the damage estimate is about \$627,000,000, while the assessment and enforcement costs (through November 30, 1994) were approximately \$7,800,000.

COMMENT: One comment questioned whether the assessment personnel would remain the same for the duration of the assessment.

RESPONSE: To the maximum extent practical, the State sought to utilize the same personnel for the same duties throughout the assessment. In large part, the State's effort in this regard was successful.

COMMENT: ARCO asserted that it is not liable for releases of the hazardous substances.

RESPONSE: ARCO has been identified by U.S. EPA and the State as the primary responsible party at facilities that have released hazardous substances in the Upper Clark Fork River Basin. Although this issue is ultimately for the courts to resolve, the State believes ARCO is liable because it falls within one or more of the four classes of potentially responsible parties under CERCLA, and there have been releases of hazardous substances from facilities for which it is responsible. Moreover, ARCO's liability is strict, joint and several. If ARCO believes it has affirmative defenses to its liability, it has the burden of establishing those defenses. The State is not aware of any defenses that would relieve ARCO of liability.

COMMENT: ARCO claims that other parties are liable for the natural resource damages.

RESPONSE: The State acknowledges that there may be other liable parties. Nevertheless, due to the history of the ownership and operations of ARCO and the predecessor companies for which it is responsible, ARCO has been identified as the primary responsible party. The State need not proceed against every responsible party, and the DOI regulations provide that claims may be limited to the significant responsible parties. 43 C.F.R. § 11.32(a)(2). Since CERCLA provides for joint and several liability, ARCO is liable for the entire injury. However, ARCO may pursue claims against other parties for the liability it alleges they have.

COMMENT: ARCO further claims that the State is liable for any natural resource damages.

RESPONSE: CERCLA establishes liability for the owner or operator of a facility from which there have been releases of hazardous substances. ARCO claims that since the State has ownership or other interests in groundwater, surface water, and streambank and bed sediments and those natural resources contain hazardous substances, the State is a liable party. The State disagrees with this interpretation of the statute and ARCO's contention that the State is liable for injuries to natural resources in the Upper Clark Fork River Basin.

COMMENT: ARCO claims that it has defenses to the State's claims for natural resource damages that were not addressed.

RESPONSE: The State disagrees that it failed to consider various defenses of ARCO. Rather, the State has drawn different legal conclusions than ARCO. Again, these issues will be for the courts to resolve.

COMMENT: ARCO claimed that it is entitled to a credit for certain natural resources it donated to the State. In particular, ARCO claimed that it donated Georgetown Lake to the State for use by the public.

RESPONSE: The State has asserted a claim for damages for injuries to certain natural resources in the Upper Clark Fork River Basin. To the extent that ARCO has restored or rehabilitated any of these natural resources, this was considered in the NRDA. This ultimately resulted in a determination of damages that is less than it would have been had ARCO not undertaken, or been required to undertake these efforts, and ARCO is not entitled to any other "credits." Additionally, ARCO is not legally entitled to any compensation for any "donations" it may have made. To the extent Georgetown Lake or any other natural resource provides a substitute for any injured natural resources, this was considered as indicated in the Report of Assessment. 43 C.F.R. § 11.84(f).

According to DOI, when Congress passed CERCLA it decided that responsible parties "should compensate the public for the resulting

natural resource damages, notwithstanding the possible societal benefits of the activities giving rise to the release." 59 Fed. Reg. 23098, 23110 (May 4, 1994). DOI further stated:

CERCLA and CWA were designed to ensure full compensation for natural resource damages resulting from hazardous substance releases or oil discharges. Nothing in the statutes suggests that trustee officials are required to assess the benefits to society of the activity giving rise to the release or discharge and claim only the net loss. Further many of these benefits are already accounted for in current market activity whereas the costs of the associated releases or discharge are not.

Id.

COMMENT: ARCO stated that the State should expeditiously respond to the comments received on the Assessment Plan.

RESPONSE: The State reviewed all of the comments received almost immediately following their receipt. Notwithstanding ARCO's criticisms of the Assessment Plan, the State saw no reason to deviate from the procedure established in the regulations. As discussed, the regulations require comments and responses thereto to be included in the Report of Assessment.

COMMENT: ARCO commented on Part II of the Assessment Plan that there was no indication that its comments on Part I were considered.

RESPONSE: The State reviewed all comments on Part I of the Plan almost immediately following their receipt. Certain aspects of Part I of the Plan were modified and reissued in Part II of the Plan for additional public comment. For example, the selection of groundwater control sites was modified.

In addition, the State's consideration of all comments received should not be equated with adopting the viewpoint espoused by the comments.

COMMENT: CTEC asked several questions relating to policy or program issues. These pertained to (1) the retroactive application

of CERCLA, (2) the liability of the State, (3) the potential effects on small mining companies, (4) the use of alternative dispute resolution, and (5) the future of the State's Natural Resource Damage Program.

RESPONSE: (1) CERCLA applies retroactively to releases of hazardous substances that occurred prior to the enactment of the statute. Courts have held that retroactive application is constitutionally permissible. There is a limited exception to CERCLA's retroactive application for natural resource damages where the damages and the releases of hazardous substances occurred wholly before the enactment of CERCLA on December 11, 1980. The precise parameters of this defense and its application to the facts of the State's lawsuit are legal issues for the courts ultimately to resolve. The State believes that this defense is inapplicable here because both the releases and damages have continued after December 11, 1980.

(2) A state can be liable pursuant to CERCLA. The liability of the State of Montana for natural resource damages is a legal issue for the courts to resolve. The State does not believe it is liable for releases of hazardous substances causing injuries to natural resources.

(3) Individual miners and small mining companies can be potentially responsible parties pursuant to CERCLA. The State has not pursued any such potentially responsible parties for damages for injuries to natural resources in the Upper Clark Fork River Basin.

(4) The State and ARCO attempted to settle the lawsuit. Settlement, however, was not achieved and in the fall of 1994, litigation resumed.

(5) For the immediate future, the Montana Natural Resource Damage Litigation Program will pursue its claim for natural resource damages in the Upper Clark Fork River Basin. The fate of the Natural Resource Damage Litigation Program has not been determined. When appropriate, decisions concerning the Program

will be made by State officials in conjunction with the legislature.

Coordination with Other Agencies

COMMENT: One comment questioned whether there was sufficient coordination with federal trustees.

RESPONSE: As much as possible, the State coordinated its assessment activities with federal authorities. This entailed the exchange of information and numerous meetings at which issues related to the assessment were discussed.

The State has provided assessment documents to federal authorities as these documents have been generated. It should be noted that on at least two separate occasions the Department of the Interior commended the State for its efforts. On these same occasions, the Department noted that it was precluded from conducting its own assessment at the present time.

COMMENT: ARCO questioned whether the Superfund RI/FS process would address the injuries to natural resources.

RESPONSE: The goal of the natural resource damage provisions of CERCLA is to restore natural resources to their baseline conditions (i.e. conditions that would have existed without the releases of hazardous substances). The Superfund RI/FS program, although it may remediate threats to human health and the environment, does not necessarily restore the resources to their baseline conditions. The relationship of response actions and restoration planning is discussed in the Restoration Determination Plan. Specifically, the effects and anticipated effects of actual and anticipated response actions selected as a part of the Superfund RI/FS process were considered in the Restoration Determination Plan. 43 C.F.R. § 11.82(a)(1)(i).

COMMENT: ARCO commented that the NRDA was speculative because the RI/FS process will not be complete until after the year 2000.

RESPONSE: ARCO's comment is disingenuous. In 1989 ARCO claimed "completion of the RI/FS is not essential to resolution of the NRDA, as substantial information has already been generated" and "because an abundance of data has been accumulated, the prosecution of this action need not await completion of the remaining" RI/FS studies. As a result the court lifted the stay in Montana v. ARCO and the State proceeded with this NRDA. Furthermore, the DOI regulations do not require that the Superfund RI/FS be completed before an NRDA is performed. If Superfund response actions will not be completed until after the NRDA has been initiated, the anticipated effects of the response actions should be included in the assessment. 43 C.F.R. § 11.84(c)(2). In fact, the effects of actual and anticipated response actions were factored into the Restoration Determination Plan.

COMMENT: Another comment questioned how the assessment would be coordinated with the Superfund RI/FS process.

RESPONSE: In accordance with the DOI regulations, the assessment was coordinated with the Superfund RI/FS activities through regular communication with U.S. EPA and Montana Superfund Project Managers for the various Superfund operable units. 43 C.F.R. § 11.31(a)(3). Data, information and reports prepared as a part of the Superfund process were provided to the Montana Natural Resource Damage Litigation Program. Similarly, information and data generated during the course of the assessment was provided to U.S. EPA and Montana Superfund authorities. Extensive communication and coordination occurred with respect to remedial actions and the restoration alternatives analyzed and selected by the State in the Restoration Determination Plan. Exchanges between various governmental authorities are on-going.

COMMENT: An additional comment questioned the use of data and information collected as part of the Superfund RI/FS process.

RESPONSE: The State conducted its assessment in a cost-effective manner and at a reasonable cost. This required the

utilization of data and information obtained through the Superfund RI/FS activities, other federal and state regulatory activities, and other appropriate investigations and studies. DOI "encourages trustee officials to make full use of relevant information in any RI/FS that has been prepared." 58 Fed. Reg. 39346. All such information was reviewed for reliability. Finally, all data and information relied upon by the State in its assessment is identified in the various reports comprising the Report of Assessment.

COMMENT: A similar comment asked whether risk assessment data collected in the RI/FS process would be used.

RESPONSE: All relevant data from the RI/FS process was utilized in the NRDA.

COMMENT: Another comment questioned whether changes in the schedule of the Clark Fork Master Plan would impact the NRDA.

RESPONSE: Changes in the schedule of the (Superfund RI/FS) Master Plan did not change the assessment schedule.

COMMENT: One comment criticized the RI/FS process.

RESPONSE: Comments related to the Superfund process should be directed to the U.S. EPA.

COMMENT: U.S. EPA, in a comment, requested certain data, particularly biological data, collected as part of the assessment.

RESPONSE: The State has provided biological data to U.S. EPA collected during its damage assessment through the release of various resource injury reports and supplemental appendices.

Injury Assessment - General

COMMENT: ARCO claimed that the State was not the trustee for all of the natural resources for which it sought damages, particularly for privately owned natural resources.

RESPONSE: This comment raises a legal issue which in the final analysis will be for the courts to decide. Nonetheless, the State disagrees that the scope of its assertion of trusteeship is impermissibly broad. The State may recover damages for natural resources "belonging to, managed by, held in trust by, appertaining to, or otherwise controlled by the State." 42 U.S.C. § 9601(16). Thus, a State is not limited to recover damages only for those natural resources that it owns. A "substantial degree of government regulation, management or other form of control over the property would be sufficient to make the CERCLA natural resource damage provisions applicable." Ohio v. U.S. Dept. of the Interior, 880 F.2d 432, 461 (D.C. Cir. 1989).

The State identified the basis of its trusteeship in its Notice of Intent to Perform an Assessment and in Appendix A of its Introduction to Report of Assessment. Constitutional provisions, statutes, regulations, and case law establish the State's trusteeship for all of the groundwater, surface water, stream bank and bed sediments, air, and fish and wildlife within the Clark Fork River Basin. The State is also trustee for all land, including soil and vegetation, that it owns, manages, controls, holds in trust, or that otherwise appertains to the State. The State did not assess damages for purely private resources, such as privately owned land in which the State did not otherwise have a trusteeship interest. The State did determine damages to soil and vegetation on such privately owned land to the extent it served as habitat for wildlife for which the State is trustee.

COMMENT: ARCO claimed that the State was not the trustee of all "public" natural resources, and that certain United States agencies are potential trustees of natural resources.

RESPONSE: The State acknowledges that the United States, through its Departments of Agriculture and the Interior, is a trustee for certain natural resources. For example, these federal departments are a trustee for land and resources within national parks and national forests. The State did not seek to determine

injury for these natural resources. The State is a trustee for all groundwater, surface water, streambank and bed sediments, air, and fish and wildlife within the Clark Fork River Basin. The scope of the State's trusteeship also includes land and its associated soil and vegetation, that the State owns, manages, controls, holds in trust, or that otherwise appertains to the State.

COMMENT: DOI requested that the State specifically exclude from its assessment lands and other natural resources owned by the United States such as the Grant-Kohrs Ranch National Historic Site.

RESPONSE: As noted, the State did not seek to determine injuries to natural resources outside of the riparian zone at the Grant-Kohrs Ranch National Historic Site.

COMMENT: ARCO stated that the Assessment Plan should contain more detailed descriptions of the injured natural resources. The Clark Fork-Pend Oreille Coalition made a similar comment. DOI requested additional information on the specific natural resources included in the NRDA.

RESPONSE: Resources identified by the Assessment Plan subject to assessment were: 1) fish in Silver Bow Creek and the Clark Fork River; 2) surface water and sediments in Silver Bow Creek, Warm Springs Ponds, and the Clark Fork River; 3) certain groundwater aquifers in the Butte, Montana Pole, Anaconda, and Milltown areas; 4) certain riparian resources in the Silver Bow Creek, Warm Springs Ponds and Clark Fork River areas; and 5) upland resources including air, soil, vegetation, and wildlife resources in the Butte and Anaconda areas. The general descriptions of these natural resources met the purposes of an assessment plan pursuant to the DOI regulations. More detailed information regarding the natural resources assessed is included in the various reports comprising the Report of Assessment.

COMMENT: One comment requested additional information on the downstream boundary of the assessment and the outline of the Milltown assessment area.

RESPONSE: With one exception, the downstream boundary for the Clark Fork River Basin NRDA is the Milltown Dam. This boundary was selected because it coincided with the boundaries and data collection efforts of the Superfund RI/FS process and because available data indicated that it would have been difficult to establish that any injuries to natural resources below the dam resulted from the releases of hazardous substances for which ARCO is responsible. The time allowed by the Court to complete the NRDA and the cost of attempting to determine and quantify injury and calculate damages made it impractical to complete an NRDA downstream of the Milltown Dam. The exception referred to above is the groundwater injury determination and quantification. Groundwater injury determination and quantification is based on the identified and measured groundwater contaminant plume. This plume extends some distance downgradient of the Milltown Dam.

COMMENT: Both the Clark Fork - Pend Oreille Coalition and DOI questioned why the focus of the injury assessment to terrestrial resources was limited to the Clark Fork watershed, and whether the State determined that smelter emissions did not injure resources east of the Continental Divide. The Clark Fork - Pend Oreille Coalition also questioned why the assessment to terrestrial resources did not extend downstream of Garrison.

RESPONSE: It was not determined that smelter emissions did not injure terrestrial resources, such as soil, vegetation or wildlife, outside of the Upper Clark Fork River Basin. As discussed in the previous response, the NRDA was limited to the Upper Clark Fork River Basin because it coincided with the RI/FS boundary and available data indicated that impacts to natural resources from the release of hazardous substances were of most significance in the Upper Basin.

It was also not determined that there were no injuries to terrestrial resources downstream of Garrison. But, available evidence and simple observation indicated that vegetative impacts downstream of Garrison were much less severe than those in the Clark Fork River watershed upstream from Garrison.

The State does not believe that it impermissibly or inappropriately circumscribed the scope of the assessment as the commenters may be suggesting. It should be noted that while the State limited the geographic extent of the assessment, the State sought to determine injury to the surface water resources of the Clark Fork River from Warm Springs Ponds to Milltown Dam--a distance of over 120 miles. The assessment concluded that this reach of the River was injured due to releases of hazardous substances from the floodplain, bed, and banks of the River. Based on this finding, the State can, and is seeking to, recover monetary damages in the form of compensable value damages and restoration costs.

COMMENT: One comment questioned whether wastes that may be exempt pursuant to the Resource Conservation and Recovery Act (RCRA) are included within the coverage of CERCLA and the NRDA. ARCO raised a similar comment.

RESPONSE: Although certain mining and milling wastes may be excluded from regulation as hazardous wastes under RCRA, they can nevertheless be hazardous substances for the purposes of CERCLA, and numerous courts have so held. See, for example, Louisiana-Pacific Corp. v. ASARCO, 6 F.3d 1332 (9th Cir. 1993).

COMMENT: Regarding the "sources of hazardous substances" section in Part I of the Plan, one comment requested additional information on the Warm Springs Ponds sediments and surface water data.

RESPONSE: The information provided in the Plan was only used to determine that hazardous substances were released from facilities for which ARCO is responsible and that natural resources

for which the State is trustee were exposed to hazardous substances. Representative information provided by the State on Warm Springs Ponds sediments (Assessment Plan, Part I, Table 2) and surface water (Part I, pages 13-15) met these objectives. Additional information is included in the Aquatics report of the Report of Assessment.

COMMENT: A comment questioned how releases of hazardous substances from tailings deposits would be confirmed.

RESPONSE: The DOI regulations require that when determining injury to a particular resource, the pathway by which a hazardous substance reaches an injured resource be identified. 43 C.F.R. § 11.63. Accordingly, the identification of a pathway is used to link the releases of a hazardous substance with the injury. The pathway determination primarily relied on RI/FS data.

COMMENT: Another comment questioned how a pathway determination would show sufficient concentrations of hazardous substances to determine injury.

RESPONSE: The commenter appears to be confused about the elements of a pathway determination and the rationale for such a requirement. Identifying the pathway the hazardous substance took from the source of the release to the injured resource links the release, the pathway, and the injury. While a pathway determination is a necessary component of determining injury to a particular resource, the pathway resource need not be injured, although it can be. One method of demonstrating that a particular resource served as a pathway is to identify concentrations of the hazardous substance in the pathway resource sufficient to enable the pathway resource to carry the hazardous substance to the injured resource. 43 C.F.R. § 11.63(a)(2).

COMMENT: ARCO commented that models cannot determine pathways; they can only predict potential for exposure.

RESPONSE: The DOI regulations allow modeling to be used to demonstrate pathway. 43 C.F.R. § 11.63(a)(2).

COMMENT: ARCO commented on several occasions that the State reports maximum observed values in its Confirmation of Exposure section of Part I of the Plan, and that many of the cited studies are of limited geographic scope.

RESPONSE: The DOI regulations provide that exposure need only be confirmed for at least one trust resource. 43 C.F.R. § 11.34(a). The State confirmed exposure to numerous surface water, groundwater, air, geologic, and biological resources. Maximum concentrations are an appropriate illustrative tool to confirm exposure. Mean data were also reported in the Plan.

COMMENT: ARCO also commented that although mean concentrations of data were reported in the Confirmation of Exposure, insufficient information is presented to evaluate the number of samples or how mean values were calculated.

RESPONSE: Sample size information is immaterial to merely confirm exposure to hazardous substances. Mean values were calculated using standard statistical methods.

COMMENT: ARCO commented that some of the information presented in Section 6.3 of the Assessment Plan, Part I, on bed sediments applied, rather, to bank sediments.

RESPONSE: The referenced section provided data on both bed and bank sediments. The State believes, upon further review, that the information provided in Section 6.3, is accurate.

COMMENT: One comment questioned the injury definition for biological resources.

RESPONSE: The State utilized the definition of injury provided by the DOI regulations. The regulations provide that an injury to a biological resource can be demonstrated if the biological response meets four acceptance criteria. 43 C.F.R.

§ 11.62(f). The DOI regulations further provide that certain biological responses were evaluated and found to satisfy the four acceptance criteria. The State's assessment relied primarily on those biological responses already identified as meeting the acceptance criteria. Therefore, the State need not separately establish that these biological responses meet the acceptance criteria. For other biological responses, the State met the acceptance criteria.

COMMENT: Some comments stated that a non-degradation standard should be used to determine injury to groundwater and surface water resources.

RESPONSE: The DOI regulations do not establish non-degradation of groundwater or surface water as an injury definition. See 43 C.F.R. §§ 11.62(b)&(c).

Nevertheless, if there is an injury to groundwater or surface water pursuant to the DOI regulations, then the resource must be restored to its baseline condition. Baseline is the condition that would have existed had the releases of hazardous substances not occurred. Therefore, where the baseline condition was cleaner than the standard, the quantification of injury and the determination of damages are based upon the change from baseline, rather than on the extent of divergence from standards. 51 Fed. Reg. at 27688.

COMMENT: ARCO commented that the Assessment Plan did not sufficiently identify baseline conditions to determine and quantify injuries.

RESPONSE: "Baseline" means the conditions that would have existed at the assessment area had the releases of hazardous substances not occurred. 43 C.F.R. § 11.14(e). Baseline conditions are important for the purposes of determining and quantifying injuries. Baseline was in significant part determined by examining control areas or resources. A "control area" or "control resource" is one unaffected by the releases of the hazardous substances under investigation, and it is selected for

its comparability to the injured area or resource. 43 C.F.R. § 11.14(i). The purpose of the Assessment Plan is to identify the methodologies for injury determination and quantification, including the methods for determining baseline conditions. The assessment then implements the methodologies to make the determinations. Baseline conditions were determined during the course of the assessment.

COMMENT: ARCO commented that the Assessment Plan did not include methodologies to distinguish between those injuries resulting from releases of hazardous substances and those resulting from other causes, such as natural phenomena or human activities other than mining. ARCO also commented that impacts on natural resources, other than those resulting from hazardous substances, were ignored by the State in its Plan.

RESPONSE: In determining and quantifying injury, control areas and control resources were selected based on their comparability to the injured areas and resources, except that they were unaffected by the releases of hazardous substances in question. 43 C.F.R. § 11.14(i). By the selection of control sites, the State was able to distinguish impacts resulting from releases of hazardous substances and impacts resulting from other causes. 43 C.F.R. § 11.72(d). Accordingly, the State determined the natural resource damages resulting from the releases of hazardous substances for which ARCO is responsible.

COMMENT: ARCO claimed that the Assessment Plan did not specifically identify control areas or the methods for selecting control sites.

RESPONSE: The control areas were selected as a part of the assessment and are identified in various resource reports comprising the Report of Assessment. There is no requirement to identify the control areas in the Assessment Plan.

COMMENT: ARCO commented that the time period for the State's assessment is not clearly defined and that the State has not provided a method for tracking baseline services through time.

RESPONSE: The State has developed research plans to quantify past, present, interim (to restoration), and residual (after restoration) damages. Baseline conditions are the conditions that "would have existed at the assessment area had the . . . release of the hazardous substance . . . not occurred." 43 C.F.R. § 11.14(e). Baseline conditions should take into account both natural processes and human activities, and should include the normal range of physical, chemical, or biological conditions for the assessment area or injured resource. 43 C.F.R. § 11.72(b). In addition, baseline data collection "shall be restricted to those data necessary for a reasonable cost assessment." 43 C.F.R. § 11.72(b)(4). Because releases of hazardous substances have occurred continuously at the Clark Fork sites from the late 1800s through the present, historical (i.e., pre-release) baseline data are not available. Where historical baseline data are not available, "baseline data should be collected from control areas." 43 C.F.R. § 11.72(d). Distinct control areas were identified by the State for its assessment of injury to surface water, groundwater, fisheries, soils, vegetation, wildlife, and wildlife habitat. These control areas are described in greater detail in the various resource reports of the Report of Assessment. Discussion of the concept of "services" is found in the responses to the damage determination comments.

COMMENT: The Clark Fork - Pend Oreille Coalition questioned the meaning of the term "large-scale mining" and the relevance of the term to the Assessment Plan.

RESPONSE: The Clark Fork River Basin has been mined extensively since the late 1800s. Because most area streams have been mined to some extent over the past 100 years, the State considered some small-scale and placer mining to be a component of baseline conditions in the area. Thus, by the term "large-scale

mining," the State meant mining other than placer mining and other small-scale mining.

COMMENT: ARCO commented that the Assessment Plan does not provide for coordination between surface and groundwater studies.

RESPONSE: All injury studies were coordinated in order to meet the State's technical and reasonable cost criteria. First, Superfund RI/FS documents were used to provide information relating groundwater pathways to surface water resources. Second, surface water and groundwater field studies were conducted at different sites.

COMMENT: ARCO commented that the injury assessment focused exclusively on the natural resources and failed to assess the services provided by the natural resources.

RESPONSE: The Assessment Plan specifically states the impacts on the service flows of the injured natural resources will be evaluated. Assessment Plan, Part II, Sections 4.3.1, 4.4.1, 4.5.1 & 4.6.1. The results of this evaluation are contained in the Report of Assessment. Additional discussion is continued in the damage determination section of the response to comments.

COMMENT: ARCO commented that the Assessment Plan did not contain sufficiently specific estimates of natural recovery periods.

RESPONSE: The State's estimates of natural recovery periods are contained in Section 3.0 of Part II of the Plan. The assessment plan need only contain preliminary estimates of the recovery period. 43 C.F.R. § 11.32(a)(2). The Plan indicated that natural recovery periods for injured natural resources may be in the hundreds of years. These estimates were based in large part on on-going Superfund RI/FS work. This met the purposes of an assessment plan. In accordance with the DOI regulations, more refined estimates of recovery periods were developed as a part of

the assessment. 43 C.F.R. § 11.73. These results are contained in the resource reports of the Report of Assessment.

COMMENT: Some comments on Part I of the Assessment Plan requested additional information regarding damage determination, including groundwater prices, and past, present, and future uses.

RESPONSE: Information on damage determination methodologies was presented in Part II of the Assessment Plan. The Assessment Plan was not utilized to calculate damages. Damage determination reports are included in the Report of Assessment.

COMMENT: One comment suggested that arsenic should be included in more analyses.

RESPONSE: Arsenic was analyzed in numerous studies as indicated in the Assessment Plan, such as fisheries (Plan, Part I, page 36), sediments (Part I, page 45), and groundwater (Part I, page 47). Additional arsenic data were available from existing Superfund RI/FS studies. Arsenic was not analyzed where the State determined that it was not relevant to injury determination.

COMMENT: One comment questioned why the State did not include injury to aquatic invertebrates in the Plan.

RESPONSE: The Plan focused on assessment activities that required new data collection efforts, as described in research protocols for various resources. Extensive data on aquatic invertebrates have been collected by other investigators. However, aquatic macroinvertebrates were collected from the Clark Fork River for the food chain study. This study confirmed that aquatic macroinvertebrates were a pathway to trout. The State relied on existing data to determine that aquatic invertebrates in Silver Bow Creek were injured.

COMMENT: Another comment suggested that amphibians should be considered as a biological pathway.

RESPONSE: Although amphibians may serve as a pathway of hazardous substances to certain species, it is unlikely that this pathway is a major cause of injury. The State focused its pathway investigation in a cost effective manner.

Injury - Fish

COMMENT: Two comments questioned the selection of fish species for inclusion in the assessment.

RESPONSE: The State's claim quantified injury to species of trout that were present in control streams to a significant extent. As a result, the State primarily assessed brown trout and rainbow trout.

COMMENT: ARCO commented that fish populations in the tributaries in the Upper Clark Fork River Basin are comprised predominantly of brown trout, while rainbow trout are common in Rock Creek. ARCO further comments that the State's citation regarding varieties of trout species in the Blackfoot River fails to recognize patterns in the distribution of trout species in mining-impacted streams.

RESPONSE: ARCO's comment on trout in Rock Creek is correct. However, other species, besides brown trout, are common in the Clark Fork River tributaries. Cutthroat trout are common in segments of most of its major tributaries including Rock Creek, Little Blackfoot River, Blackfoot River, and German Gulch (a tributary to Silver Bow Creek). While the State's citation regarding trout species in the Blackfoot River does not discuss the distribution of trout species in mining-impacted streams, the State's quantification of injury to trout evaluated both differences in trout numbers between the Clark Fork River, Silver Bow Creek and matched control streams, and the distribution of brown and rainbow trout in the Clark Fork River.

COMMENT: ARCO cited a study by Moore et al. (1991) to argue that brook and cutthroat trout are dominant in the headwaters of the Blackfoot River, which is impacted by mining.

RESPONSE: While ARCO contends that brook and cutthroat trout are the dominant trout species in this area, Moore's paper attributes a decline in trout populations in the Blackfoot River to the movement of metals from a historic mining area in the upper Blackfoot River. Further, the State's assessment has shown that metals have caused injury to trout in the Upper Clark Fork River.

COMMENT: ARCO commented that toxicity testing should be conducted to represent conditions on the Clark Fork River and that data supporting the selection of water quality conditions should be presented.

RESPONSE: Water quality conditions for the toxicity tests and how they relate to conditions in the Clark Fork River are described in section 7.4.4.1 of the Assessment Plan. Test conditions are based on empirical data collected from the Clark Fork River, and have been determined by the State and other organizations (U.S. EPA, U.S. Fish and Wildlife Service and ARCO, among others) to be representative of those found in the Clark Fork River.

COMMENT: ARCO commented that adjustments should be made to provide for the eating habits of juvenile fish during the toxicity testing.

RESPONSE: The State agrees. The juvenile fish were observed to ensure that food was eaten. Also, controls were used for comparisons during the exposure.

COMMENT: Regarding the physiological impairment tests, ARCO commented that none of the physiological endpoints (e.g., lipid peroxidation, stress proteins, etc.) can be related to injury determination.

RESPONSE: The health of fish from both a controlled laboratory experiment and the field were monitored. Physiological

endpoints were used to monitor the health of these fish and thus determine if they are physiologically impaired. Histopathology is commonly used by the U.S. Fish and Wildlife Service (among other agencies) to define the presence of abnormal tissues in fish. Lipid peroxidation results in changes in the structural integrity of cell membranes and may ultimately result in cell death and tissue damage (Halliwell and Gutteridge 1985). Stress proteins are a family of highly conserved proteins which are induced by stress such as heat or chemicals. It is believed that these proteins interact with deformed proteins to "protect" the cell against these deformities (Alberts et al. 1989). Dyer et al. (1990) found induction of stress proteins in fathead minnows following copper exposures. Metallothioneins are metal binding proteins that are inducible during stress. All of the above studies, in addition to those presented in the Aquatics Report of the Report of Assessment, indicate that fish have been physiologically impaired, and thus meet the injury definition in the DOI regulations.

COMMENT: ARCO further commented that histological examinations of fish tissues are irrelevant because the laboratory exposures do not replicate natural conditions in the Clark Fork River. In addition, ARCO commented that the State has not shown that there is a relationship between tissue-metal concentrations and injury.

RESPONSE: The dietary exposure utilizes dietary sources collected from the Clark Fork River. There were two aqueous conditions, one without metals and one with cadmium, copper, lead and zinc added in concentrations within the guidelines of the U.S. EPA water quality criteria. Aqueous conditions also represented those found in the Clark Fork River. The use of histological examinations is important to establish changes in the fish health status of these early lifestage fish reared on a diet collected from the Clark Fork River. The Aquatics Report of the Report of Assessment demonstrates the relationship between histological examinations and injury to fish.

COMMENT: ARCO commented that there is no reason to conduct physiological studies because there is no evidence of metal-dependent injury.

RESPONSE: The physiological studies were included to examine physiological malfunctions, disease, and physical deformations. These are injury determination criteria pursuant to the DOI regulations. 43 C.F.R. § 11.62(f).

COMMENT: ARCO commented that the Assessment Plan fails to indicate how pulse conditions will compare to conditions in the Clark Fork River.

RESPONSE: The Assessment Plan stated that the pulse concentrations were based on field data during actual pulse events from the Clark Fork River (collected by various state and federal agencies).

COMMENT: DOI suggested that water quality data in pulse experiments be listed, that two hours may be too short a pulse exposure period, and that pH should be varied in pulse experiments.

RESPONSE: The State has provided all water data for pulse events; pulse exposures ranged from 6-8 hours; the pH was varied in experiments. This is contained in the Aquatics Report of the Report of Assessment.

COMMENT: DOI commented that the number of fish samples be increased for physiological impairment measurements, and that water samples be taken concurrently.

RESPONSE: Because the physiological determinations provide information about the exposure history of the fish collected, water samples collected at that point in time would add little information. The Plan allowed for sufficient numbers of fish to be analyzed to provide robust data.

COMMENT: Regarding the behavioral avoidance studies, ARCO commented that abnormal behavior in an artificial bioassay device

cannot be used to demonstrate injury. ARCO also comments that attraction is important to injury determination.

RESPONSE: The DOI regulations provide that behavioral avoidance of hazardous substances in the laboratory constitutes an injury. 43 C.F.R. § 11.62(f)(4)(iii)(B). Attraction is not similarly listed in the DOI regulations, and it was not important in this assessment.

COMMENT: ARCO also commented that the State provides no means of determining a relationship between survival of hatchery rainbow trout and Clark Fork River rainbow trout.

RESPONSE: The Aquatics Report of the Report of Assessment demonstrate injury to rainbow trout in the Clark Fork River. The scarcity of rainbow trout made it impossible to collect sufficient numbers from the Clark Fork River to compare their survival with hatchery rainbow trout.

COMMENT: ARCO commented that fish kills allegedly occur in the summer, but exposure conditions in toxicity experiments simulate spring conditions.

RESPONSE: Documented fish kills have occurred largely in the summer. Data collected during fish kills were the basis for exposure conditions in the "pulse" experiments. Test conditions in other fish toxicity experiments were used to simulate conditions that coincided with the emergence of early lifestage fish in the spring. Because of their small size, early lifestage fish that are killed as a result of releases of hazardous substances during spring pulse exposures would not be detected in the field.

COMMENT: Another comment questioned why fish were collected in the spring from the Clark Fork River test sites.

RESPONSE: The fish samples collected during the fall were measured for tissue metal concentrations only. Other physiological parameters, along with tissue metals, were measured in samples taken from the spring collection. There was no specific reason why

fish were collected in the spring other than it was an opportune time to collect fish.

COMMENT: One comment requested information on "spring conditions".

RESPONSE: As described in the Assessment Plan, Part I (page 35), the determination of test metal concentrations representative of "spring conditions" (hardness = 100 mg/l; alkalinity = 100 mg/l; pH = 7.2-7.8) was made in joint meetings between the U.S. Fish and Wildlife Service, Montana Department of Fish, Wildlife, and Parks, U.S. Environmental Protection Agency, and ARCO.

COMMENT: ARCO commented that the State failed to indicate how physiological acclimation will be determined. ARCO also comments that the Plan contradicts itself with regard to acclimations in tasks 1 and 2.

RESPONSE: The acclimation period in Task 1 is stated as a "minimum of two weeks." This is a common time period toxicologists use to acclimate fish brought into the laboratory before they are used for testing. In task 2, the acclimation time is increased because fish are being collected from the river. This is a conservative attempt to allow fish that were not reared in a hatchery to acclimate to laboratory conditions.

COMMENT: ARCO commented that total recoverable metals have little linkage with toxicity in aquatic systems and that incidences of elevated total recoverable copper did not cause fish deaths.

RESPONSE: The U.S. EPA bases its aquatic life criteria on total recoverable metals (e.g., 50 Fed. Reg. 30784; U.S. EPA 1986, Quality Criteria for Water 1986, U.S. EPA Office of Water Regulations and Standards, Washington, DC, EPA 440/5-86-001). In more recent guidance, U.S. EPA notes that although the dissolved fraction of a metal more closely approximates the bioavailable fraction of metal in the water column than the total recoverable fraction, the total recoverable fraction had value if metals

loadings are a stress to an ecosystem, particularly in locations other than the water column. See, U.S. EPA, Office of Water Policy, Technical Guidance (Oct. 1, 1993). Such is the case in Silver Bow Creek and the Clark Fork River, where sediment and food-chain effects are known to exist.

With respect to ARCO's comment regarding incidences of elevated total recoverable copper not having caused fish deaths, the State notes that increased copper concentrations can cause avoidance behaviors--thus preventing fish kills if clean water refugia are available. Moreover, early life stages of trout are particularly sensitive to copper. Hence, elevated concentrations of copper can result in fish kills to very small (e.g., less than 2") fish. Fish kills involving such small fish are less likely to be observed.

COMMENT: ARCO commented that footnote 3 in the Plan addressing appropriate analytical methods for application of U.S. EPA ambient water quality criteria was incorrect. ARCO argues that total recoverable methods are inappropriate and that no accepted methods exist for acid-soluble metals.

RESPONSE: The footnote in question is correct. The aquatic life criteria in EPA's "Gold Book" explicitly state that "a measurement such as acid-soluble would provide a more scientifically correct basis upon which to establish criteria for metals. The criteria were developed on this basis. . . . Until (an acid soluble method is) available, however, EPA recommends applying the criteria using the total recoverable method." U.S. EPA 1986, Quality Criteria for Water 1986, U.S. EPA Office of Water Regulations and Standards, Washington, DC, EPA 440/5-86-001. As discussed in the response to the previous comment, EPA has revised its guidance on the application of ambient water quality criteria. Notwithstanding ARCO's assertion, the use of total recoverable metals for determining injury to surface water is appropriate. Consistent with EPA guidance, the State recently revised its water quality standards and adopted a total recoverable

method for evaluating compliance with ambient water quality criteria.

COMMENT: ARCO commented that the State's use of total recoverable metals and maximum metals concentrations violates the requirements of the injury quantification phase. The Missoula City-County Health Department and the Clark Fork-Pend Oreille Coalition stated that injuries to surface water and groundwater resources should be assessed using total recoverable metals analysis.

RESPONSE: As noted in the response to the previous two comments, the State has adopted a total recoverable method for evaluating compliance with ambient water quality criteria established under the Clean Water Act. Therefore, the total recoverable concentration is appropriate for determining and quantifying injury to surface water. Maximum metal concentrations are used, along with all other relevant water quality data, to demonstrate both the frequency and magnitude of both criteria exceedances and toxicological concentrations. Both total recoverable and maximum metals concentrations are appropriate for injury determination and quantification.

COMMENT: ARCO commented that studies using radioisotopic copper have shown that fish exposed to acutely toxic concentrations of copper die before their gills or other organisms accumulate significant amounts of copper.

RESPONSE: Data on metals uptake collected during the studies of Lauren and McDonald (1986) referenced by ARCO have been incorrectly interpreted by ARCO. Much of the copper that was measured in gill tissue of fish from the Clark Fork River is likely bound to the gill surface -- some of which may have become bound following the fish's death. Nevertheless, high concentrations of surface bound copper are reflective of exposure to high concentrations of copper in water and contribute to toxicity by causing production of excess mucus on the gill surface thus causing

respiratory distress. Lauren and McDonald (1986) used very small fish in their experiments (average weight was 2.46 g). Consequently, all measurements of metals in fish tissue were conducted on a whole body basis and all rates of copper uptake described in the publication are whole fish uptake rates -- not rates of copper uptake by gill tissue. Thus, the whole fish uptake rate of 90 ng/g wet weight/hr cited by ARCO has no relevance to the rate of copper accumulation by gill tissue only.

COMMENT: ARCO commented that many metals, including copper and zinc, are critically important micronutrients and that no injury can be proven by exposure to them.

RESPONSE: Many elements that are micronutrients cause physiological disturbances if present in greater than trace concentrations. U.S. EPA states in the water quality criteria documentation for copper that this metal is toxic at concentrations slightly higher than trace. Concentrations of copper and zinc at 300 ppb and 350 ppb at Deer Lodge are far beyond those of trace concentrations.

COMMENT: ARCO commented that it is inappropriate to conduct bioassays based on dissolved metals and then relate these data to total recoverable metals data.

RESPONSE: The State collected data in its assessment of injury to surface water resources for both total recoverable and dissolved metals. The dissolved method (where samples are filtered through a .45 μm filter after acidification) was used during the feeding study. Because this was a laboratory situation where all of the metals are dissolved, the difference between the two methods was negligible.

COMMENT: ARCO commented that there is no indication that trout feed on the organisms collected in the food chain study.

RESPONSE: A variety of invertebrates were collected and a composite was fed to the fish. As these are early lifestage fish

it is unlikely that they feed on anything but invertebrates, as supported by extensive fish literature. The rate of fish feed was that regularly used in fish culture.

COMMENT: ARCO commented that the evaluation of biomarkers will not provide meaningful indication of injury. ARCO further stated that it is unclear why vitamins were added to test diets.

RESPONSE: Reduction in the health of a fish population exposed to hazardous materials will result in physiological impairment. This impairment meets the definition of injury in the DOI regulations. 43 C.F.R. § 11.62(f)(1)(i). Additional vitamins in the diet ensure that the fish receive all the necessary nutrition. This was a conservative measure to ensure that the assessment did not attribute deleterious responses to the presence of a hazardous substance if a vitamin deficiency was present.

COMMENT: ARCO contended that the Assessment Plan did not demonstrate reductions in fish populations in the assessment area.

RESPONSE: The Assessment Plan was not intended to prove injury or quantify the injuries. It identified the methodologies that when implemented would determine and quantify the injury to fish. The results of these studies are provided in the Aquatics Report of the Report of Assessment.

COMMENT: Regarding fish population studies, one comment suggested that it is difficult to find control rivers with "pristine conditions."

RESPONSE: The control sites selected by the State reflect baseline conditions for the Clark Fork River, which are the conditions that would have existed had the release of hazardous substances not occurred. Pristine conditions are not a requisite for control sites, nor would they necessarily represent baseline conditions. 43 C.F.R. § 11.14(i).

COMMENT: ARCO commented that the Plan does not indicate which combinations of valley bottom types were evaluated, how control reaches were selected, and where sites were located in the Clark Fork River.

RESPONSE: The Assessment Plan provides information on methods for control site selection, as well as site locations. Sufficient detail was provided to meet the purposes of an assessment plan. 43 C.F.R. § 11.30(b). Additional detail on site selection was a part of the assessment and is contained in the Aquatics Report of the Report of Assessment.

COMMENT: ARCO commented that there was no indication in the Plan whether site-specific data were used to develop trout suitability curves for use in the PHABSIM model.

RESPONSE: No site-specific trout suitability curves were developed. The assessment relied on the extensive reviews in U.S. Fish and Wildlife Service literature for curve data. The same curves are applied to impacted and control sites.

COMMENT: ARCO commented that snorkeling is a questionable technique for population estimation and that it is difficult to distinguish rainbow and brown trout when snorkeling.

RESPONSE: The State determined that snorkeling was an accepted and preferred technique and thus meets DOI criteria. Calibration of snorkeling with electrofishing and other population estimators or census techniques have established that the snorkeling methods provide accurate and useful population estimators. Snorkeling has several advantages, including very little or no disturbance of fish behavior, no handling of the fish, and no reliance on the several undesirable assumptions of mark-recapture methods often used in electrofishing. Experienced snorkelers are capable of making the appropriate distinctions amongst types and sizes of fish.

COMMENT: ARCO commented that Smith (1989) previously reported that there were no location-dependent pathological changes in fish collected from five stations in the mainstem Clark Fork River and those collected from Rock Creek.

RESPONSE: The aquatics injury assessment showed increased health impairment of Clark Fork River trout collected from the upper river compared to trout collected from the lower river. Increased health impairment was indicated by higher tissue concentrations of hazardous substance; greater damage to liver cells; increased lipid peroxidation (which affects the integrity of cell membranes); and increased levels of metallothionein (an indicator of exposure to heavy metals), among other things. These provide clear indications of location-dependent pathological changes to trout in the Clark Fork River.

Injury - Surface Water

COMMENT: One comment suggested that injuries be examined separately for peak flows, base flows, and rising/falling branches of the annual hydrograph.

RESPONSE: The surface water injury determination was not restricted to any flow regime or discharge level. Surface water injury was determined for any flow regimes for which exceedances of relevant surface water standards were ascertained. Water chemistry data exist for each of the referenced conditions.

COMMENT: ARCO commented that it is not valid to compare average metals concentrations in the Clark Fork River with arbitrary hardness values and then imply criteria exceedances.

RESPONSE: Values presented in the Assessment Plan were drawn from relevant criteria documents for illustrative purposes only. They are representative of the hardness characteristics of many surface waters, including conditions in both Silver Bow Creek and the Clark Fork River.

COMMENT: ARCO commented that the State did not discuss the beneficial characteristics of Warm Springs Ponds and that the State has incorrectly described Warm Springs Creek as a source of hazardous substances.

RESPONSE: Although the Warm Springs Ponds reduce the loadings of hazardous substances from Silver Bow Creek to the Clark Fork River, it is nonetheless a source of metals to the river. The State has shown that the Clark Fork River and its biota downstream from Warm Springs Ponds have been injured as a result of releases of hazardous substances from facilities for which ARCO is responsible. Although Warm Springs Creek is not a major source of hazardous substances to the Clark Fork River, elevated concentrations of hazardous substances have been documented in this stream.

COMMENT: ARCO requested copies of certain standard operating procedures (SOPs) used for surface water sampling.

RESPONSE: The requested SOPs have been included in the Administrative Record.

COMMENT: The Clark Fork - Pend Oreille Coalition questioned whether "time integrated" sampling of surface water would supplement existing surface water information. It also questioned whether these data would be comparable in methods and QA/QC to existing data.

RESPONSE: The purpose of the time-integrated sampling was to evaluate water quality relative to water quality criteria (established by the Clean Water Act). Existing data had not been collected in this manner. The comment is correct in that such sampling is intended to supplement existing surface water data. All other relevant sampling conditions (e.g., QA/QC, analysis techniques) are comparable.

COMMENT: The Clark Fork - Pend Oreille Coalition questioned whether low flow conditions that existed in the spring-summer of 1992 would affect the usefulness of the data.

RESPONSE: The low-flow conditions that existed in the spring-summer of 1992 affected the range of water quality conditions that were sampled, and thus had some affect on the range of metals concentrations that were measured. However, the collected data were still useful for the purposes for which they were intended.

COMMENT: ARCO commented that the State failed to describe modeling procedures to assess the temporal and spatial distribution of injured resources.

RESPONSE: The State has presented the methods and procedures to be used in performing the surface water assessment in sufficient detail to document reasonable cost. No modeling was performed. Pathways were quantified using empirical data.

COMMENT: ARCO commented that the proposed surface water sampling will be biased because water samples will not be collected between Warm Springs Ponds and Deer Lodge.

RESPONSE: Water samples have been collected by other investigators between the Warm Springs Ponds and Deer Lodge. Moreover, the State is unaware of any "bias" that would be introduced by the lack of additional water samples taken in this reach.

COMMENT: ARCO commented that the Plan failed to provide a rationale for collecting width-integrated surface water samples.

RESPONSE: The method was used to characterize average water quality conditions across the entire width of the river.

Injury - Sediments

COMMENT: U.S. EPA asked whether sediment data would be collected from the Clark Fork River downstream from the Milltown Dam or from Warm Springs Creek.

RESPONSE: Sediment data were not collected from Warm Springs Creek or from downstream Milltown Dam. The State did not seek to determine injury to sediments downstream of Milltown Dam, nor for any other reach of the Clark Fork River or Silver Bow Creek. However, sediment data were collected from Silver Bow Creek, the Clark Fork River (Warm Springs to just above Milltown Reservoir) and from various tributaries for source and pathway information. Sediments were evaluated for source and pathway information.

COMMENT: Another comment noted that injury determination for sediments will depend on the location of the stream channel and requested elaboration on the working definition of stream channels.

RESPONSE: As the previous response noted, the State did not seek to determine injury to sediments.

COMMENT: Another comment asked why sediment samples are not being tested for VOCs, PCBs, or other chemicals.

RESPONSE: Samples were taken of fine-grained sediments and analyzed for pentachlorophenol (PCP). PCBs were not analyzed because the State did not suspect their presence.

COMMENT: ARCO commented that geologic resources other than sediments were not contained in Part I of the Plan.

RESPONSE: Research methodologies for soils are provided in Part II of the Plan.

COMMENT: ARCO commented that no mention is made in the Plan on contribution of metals from tributaries to the Clark Fork River.

RESPONSE: Other than tributaries impacted by releases of hazardous substances from facilities for which ARCO is responsible, no other tributaries were thought to have contributed, in any way, hazardous substances to the Clark Fork River. The Report of Assessment confirmed this. For example, as indicated in the Aquatics Report of the Report of Assessment, Flint Creek is elevated in arsenic and lead, but is a very minor source of these

metals to the Clark Fork River. Elemental ratio "signatures" for these metals indicate the contribution from Flint Creek has only a de minimis effect on the metal concentrations of Clark Fork River sediment. Other hazardous substances, namely cadmium, copper, and zinc, have no significant tributary sources other than Silver Bow Creek.

COMMENT: ARCO commented that elevated metals in sediments do not cause injury to aquatic resources. ARCO cites a study by Luoma (1989) as support for this argument.

RESPONSE: First, the Aquatics Report of the Report of Assessment addresses the link between metals in sediments and injury to aquatic resources. The Aquatics Report demonstrates that such a link, in fact, exists. The State's food chain experiments clearly show that trout have been injured as a result of elevated concentrations of hazardous substances in benthic macroinvertebrates. These benthic macroinvertebrates, which are consumed by trout, are contaminated from the elevated levels of metals in sediments.

Second, Luoma (1989) does not say that there is no connection between sediment metal concentrations and "injury" to aquatic resources. He states: "Several prerequisites are necessary to better understand the processes that control metal bioavailability from sediments," one of which is a "better understanding of the processes controlling bioaccumulation of metals from solution and food by metazoan species directly exposed to sediments." In fact, Luoma's paper repeatedly indicates that sediments are an important source of contamination to biota.

COMMENT: ARCO commented that the Plan does not indicated how grain-size fraction will be determined for streambed sediments.

RESPONSE: The State restricted sampling to the less than 63 micrometer fraction precisely because this minimizes effects of grain size on metals concentrations and because sediments of this size are readily ingested by aquatic macro-invertebrates.

COMMENT: ARCO commented that the Plan fails to address how data on carbon fractions will be used.

RESPONSE: Carbon analyses are useful in understanding the variation in metals concentrations in fine sediments sampled in close proximity. That is, organic carbon content can help explain within-site variations in metals concentrations.

Injury - Groundwater

COMMENT: One comment questioned whether reliance on standards for determination of injury would weaken the State's ability to restore the groundwater resources.

RESPONSE: In determining damages for injuries to groundwater aquifers, the cost of restoration to baseline is one economic measure of damages. If there is an injury to groundwater pursuant to the DOI regulations, then the resource can be restored to its baseline condition, even if this is below standards.

COMMENT: Another comment suggested that the State include in its assessment the groundwater in the Warm Springs Ponds and Deer Lodge Valley.

RESPONSE: The State included groundwater aquifers in the Warm Springs Ponds, Opportunity Ponds, and Anaconda areas as part of its assessment. Reliable groundwater data outside these three areas within the Deer Lodge Valley is limited, and the State is not aware of any such data that clearly identifies additional areas of groundwater injury as defined by the DOI regulations. The cost of collecting additional data to look for additional areas of injury (installing bedrock and alluvial well sampling and analysis) was determined not to be cost effective.

COMMENT: ARCO commented on Part I of the Assessment Plan that Thompson Park was not demonstrated to be an appropriate control area for Butte groundwater quality. In response to Part II of the Assessment Plan, the Clark Fork - Pend Oreille Coalition questioned why Thompson Park was dropped as a control area for Butte

groundwater quality. Another comment questioned whether additional control wells would be drilled in Butte.

RESPONSE: The State indicated in Part I of the Assessment Plan that Thompson Park was an appropriate control area for Butte groundwater quality. Upon further review, as indicated in Part II of the Assessment Plan, Thompson Park was not used as a control area for Butte groundwater. Existing data from the Butte Hill area was used to help characterize baseline groundwater quality. The State determined that the active mine area represented a more appropriate control area because of the proximity to the ore body mined by ARCO and its predecessors. In addition, the State determined that additional wells were required in order to establish baseline conditions in the alluvial aquifer. Three wells were drilled and sampled using funds provided by ARCO and obtained through the previously agreed upon Administrative Order on Consent for the Butte Area Mine Flooding Operable Unit.

COMMENT: ARCO commented that groundwater in rich geological units should be expected to have high metals levels and elevated levels of hazardous substances may be naturally occurring.

RESPONSE: The State's selection of appropriate control sites was designed to account for this possibility. Results of the State's baseline determination for groundwater are contained in the Butte groundwater resource report of the Report of Assessment.

COMMENT: ARCO questioned the collection of field data that are not measurements of hazardous substances.

RESPONSE: Such measurements are standard practice in groundwater sampling. This data will be used to help characterize groundwater chemistry and aquifer hydrology.

COMMENT: Several comments requested whether total recoverable or dissolved concentrations of metals would be measured in groundwater.

RESPONSE: Both techniques were employed by the State in its assessment.

Injury - Air

COMMENT: One comment asked whether past or new data would be used to confirm releases of hazardous substances from smelters.

RESPONSE: Past data was used to confirm past releases. Present data was used to confirm continuing releases.

COMMENT: ARCO commented that there is no discussion of current air quality at impacted sites.

RESPONSE: Air operated, and continues to operate, as a pathway of hazardous substances to soils and vegetation. This data is presented in the Terrestrial Report of the Report of Assessment. However, the State has not claimed that air is injured. It is a pathway resource.

COMMENT: The Clark Fork - Pend Oreille Coalition questioned why "existing data" were used in determining injury to air.

RESPONSE: The existing data used included Superfund RI/FS reports, other State documents, industry reports and data, academic research, and other data relevant to the determination of injury. Sufficient existing data were available to the State in order to determine that air has operated, and continues to operate, as a pathway resource.

COMMENT: ARCO commented that existing data used by the State to assess injury to air must be identified.

RESPONSE: All data, sources, literature studies, or other sources of information used in the Assessment Plan were referenced in the "Literature Cited" section. All data, sources, literature studies, or other sources of information used in the State's assessment are presented in the Report of Assessment.

COMMENT: ARCO commented that the Plan's approach to quantifying injury to air was inadequate.

RESPONSE: The comment is moot since the State did not determine injury to air. Rather, as noted previously, the State determined that air has operated, and continues to operate as a pathway resource to soils and vegetation. Sufficient existing data were available to the State to make this determination.

COMMENT: The Clark Fork - Pend Oreille Coalition questioned whether the DOI criteria for determining injury to air resources would discount injuries incurred from the cumulative effects of continued low-level releases of hazardous substances.

RESPONSE: This comment, concerning the appropriateness of the DOI regulations, would be better directed at DOI. Nonetheless, and in response to the comment, it should be noted that the DOI regulations allow injury to be determined as a result of long-term, low-level releases of hazardous substances. 43 C.F.R. § 11.62(d)(2).

Injury - Soils

COMMENT: ARCO commented that the baseline soil hazardous substance concentrations identified in the Plan were too low.

RESPONSE: The State used control sites to determine baseline conditions for soils. With respect to the data presented in the Assessment Plan, the State could have used even lower baseline soil hazardous substance concentration values as evidenced from the reports by Ray (1983) and Rice & Ray (1984). By opting for the CH2M Hill values cited in the Plan, the State selected conservative values.

COMMENT: ARCO commented that the soil sampling was not cost-effective or coordinated with Superfund RI/FS activities.

RESPONSE: Soil samples were collected primarily at sites not sampled previously in Superfund RI/FS studies to avoid unnecessary duplication of effort. Therefore sample collection was both cost

effective and coordinated. A limited numbers of samples were collected in previously-sampled areas in order to (1) provide methodologically consistent data based on the uniform grid sampling design, and (2) provide soil samples for phytotoxicology studies.

COMMENT: DOI commented that inhibition of microbial activity could be used to support the injury claim for soils and vegetation.

RESPONSE: Inhibition of microbial activity is one injury definition pursuant to the DOI regulations. 43 C.F.R. § 11.62(e)(5). The regulations do not require that all the methods of determining injury be shown. Phytotoxic response provided sufficient means to determine injury to soils and vegetation. The soil/vegetation protocols were sufficient to determine and quantify injuries.

COMMENT: ARCO commented that the Assessment Plan does not adequately define injury to soils.

RESPONSE: This information is provided at Section 2.4.1.1 (page 7) of the Assessment Plan, Part II. As indicated previously, phytotoxic responses in plants were used to determine injury to soils and vegetation.

COMMENT: ARCO states that the use of archival aerial photographs to map the extent of bare soils is inappropriate to determining injury.

RESPONSE: The State concurs that the use of historical photos alone to determine injury would be inappropriate. The State used historical photographs and other methodologies to confirm injury and to identify the spatial extent of past injuries that persist until the present.

COMMENT: ARCO commented that there was confusion regarding the differences between "soils" and "sediments".

RESPONSE: For the purposes of the State's assessment, "sediments" refer to bed sediments underlying surface waters and

bank sediments. "Soils" refer to surficial deposits that normally support terrestrial vegetation, including both upland soils and riparian soils. This is consistent with the DOI regulations.

COMMENT: ARCO questioned the relevance of the proposed investigation of erosional and depositional areas, and the hypotheses to be tested by such an investigation.

RESPONSE: Investigation of erosional and depositional was not undertaken.

COMMENT: ARCO questioned the State's definition of "slickens" and commented that the "post classification" of riparian soils is not explained fully.

RESPONSE: Slickens are defined as undifferentiated tailings deposits devoid of living endemic vegetation and evidence of organic decay of dead vegetation. Non-slickens areas are distinguished as floodplain soils and sediments that support living regenerating endemic vegetation communities and that have evidence of vegetation decomposition and nutrient recycling. The State opted not to sample riparian non-slickens areas because they were, by definition, not deemed to be grossly impacted. Thus, post-classification of soils was not necessary.

COMMENT: The Clark Fork - Pend Oreille Coalition questioned the adequacy of sampling soils within the top six inches.

RESPONSE: Numerous soil sampling studies in the past twenty years have determined that concentrations of hazardous substances deposited on the soil surface as a result of smelting emissions are greatest in the upper soil horizons (e.g. Taskey (1972) top 6 to 8 inches; Munshower (1972) 4 to 6.5 inches; Tetra Tech (1987) top 2 inches). Their findings suggested that leaching of metals had not proceeded beyond the 10 to 25 inch level. Additional studies concluded similar distribution patterns in untilled/undisturbed soils. Tailings deposited in floodplain soils do not typically show the same vertical gradient. Nevertheless, concentrations in

tailings deposits are sufficiently high and uniform throughout the deposit that a composited six inch sample is considered sufficient to characterize the plant growth zone.

Injury - Vegetation

COMMENT: ARCO commented that the Munshower and PTI references were inappropriate because only selected vegetation communities were studied.

RESPONSE: Both the PTI and Munshower studies were used to confirm exposure of vegetation communities to contamination. Control areas in Munshower were not used to quantify injury. These data can be used to illustrate exposure levels associated with contamination.

COMMENT: ARCO commented that the presence of hazardous substances in vegetation does not necessarily mean that injury has occurred.

RESPONSE: The State concurs that the presence of substances in vegetation in itself does not necessarily mean that injury has occurred. The primary purpose of the analysis of plant residues was to assist in the evaluation of exposure conditions. The State has shown in the Terrestrial Report of the Report of Assessment that vegetation has been injured through phytotoxic responses, including inhibition of seed germination and seedling growth. The biotic and abiotic factors influencing plant uptake and assimilation of substances are complex. Furthermore, once a substance enters a plant it may or may not result in toxic responses. Each specific substance will tend to elicit physiological and toxicological responses linked to threshold levels, mode of action, and other contributing factors. Nevertheless, the "presence" of a substance in plant tissue provides important ecotoxicological information. First, "presence" of a substance confirms exposure. Absence, if proper measurement conditions have been exercised, can be a strong indication that exposure did not occur. The critical point is that regardless of

the magnitude of hazard, the risk to any individual or group of organisms is only realized upon exposure. Second, much of the phytotoxicology literature reports toxicity results in terms of tissue concentrations. Consistent with the points made above, "presence" offers the "first-cut" evidence that toxic responses might occur. Thus "presence" is important in screening efforts to focus more detailed analysis. Such focused efforts would potentially explore such physiological features as tolerance, acclimation, adaptation, avoidance, "luxury consumption," and others that influence tissue concentrations and toxicity. Finally, the State has shown in the Terrestrial Report of the Report of Assessment that vegetation exposed to hazardous substances released from facilities have been injured.

COMMENT: The Clark Fork - Pend Oreille Coalition questioned how the vegetation community structure would be evaluated.

RESPONSE: The State compared impacted sites with control sites that were selected based on factors that pertain to vegetation community composition and structure. Community endpoints addressed included species composition, numbers of species, dominance types, and numbers of habitat layers.

COMMENT: ARCO commented that vegetation sampling that duplicated existing Superfund RI/FS data was not necessary.

RESPONSE: The State's vegetation protocols were designed to avoid unnecessary duplication of effort and data by sampling at sites co-located with soil sampling locations.

COMMENT: ARCO commented that if phytotoxic conditions are found in vegetation studies, it is as likely due to water withdrawal as it is to mine tailings.

RESPONSE: As indicated in the Assessment Plan, phytotoxicity studies were conducted in the laboratory to evaluate toxicity in controlled experiments using impact and control soils. Thus, watering (and water content) was controlled for in the laboratory.

Any potential confounding effects of water withdrawals were eliminated.

COMMENT: DOI commented that soil and vegetation sampling should be coordinated.

RESPONSE: Soil and vegetation sampling were conducted at the same sites and same times.

COMMENT: ARCO commented that the State's plant residue study will not provide a means for documenting actual metals concentrations in various habitats and vegetation types and determine how existing biomass is distributed and animals are being affected.

RESPONSE: It was not the intent of the plant residue study to determine metals concentrations in various habitat types, or to accurately determine the distribution of biomass among the constituents of the plant communities. The study was designed to determine whether hazardous substances are being incorporated into plant tissues and at what levels, thus documenting exposure conditions. Additionally, it was not the intent of the wildlife study to document the use of different habitats by wildlife species. The purpose of the wildlife study was to determine whether the ability of indigenous plant communities to provide wildlife habitat had been impacted by releases of hazardous substances. The habitat relationships to the wildlife species chosen as study species are sufficiently well known and quantified in the Habitat Evaluation Procedure (HEP) models.

COMMENT: ARCO commented that the greenhouse studies are not applicable to actual field conditions.

RESPONSE: The DOI regulations include phytotoxic responses, such as retardation of plant growth, within the injury definitions. 43 C.F.R. § 11.62(e)(10). Seed germination and root elongation protocols are preferred methods of determining phytotoxicity. 43 C.F.R. § 11.64(e)(6). The protocols employ a limited set of

domestic, herbaceous crop species. The tests as described in the protocols are intended solely as laboratory studies. Thus, the use of the greenhouse studies is entirely appropriate.

The significance of the comment pertains to the interpretation of the results. The issues of comparability (or extrapolation) of data between field and lab conditions and among different taxonomic groups are constant features of every study. However, there is literature that presents quantitative expectations for each of these issues. Variations between field and lab (greenhouse) conditions have been described statistically in a manner that permits one to characterize the probability of uncertainty at various levels. Comparable toxicological response occurs among closely related taxonomic groups. General relationships of uncertainty associated with "taxonomic distance" have been described quantitatively. The discipline of plant toxicology, during the past several years, has developed additional protocols to address soil toxicity. The work outlined in the Assessment Plan incorporated accepted elements of these technical advances to improve the ecological relevance of the tests.

COMMENT: ARCO commented that nutrients are not mentioned in the soils methods.

RESPONSE: As stated on page 16 of the Plan, Part II, (Nitrogen/Phosphorous/Potassium ratio (N:P:K) and texture will all be measured for soil samples. Growth of plants is clearly linked to nutrient quality. Vigorous vegetative growth would not be expected to occur on mine tailings. However, the scope of this assessment is not restricted to mine tailings; rather, the focus is on lands considerably removed from the tailings areas. A determination of toxicity is made with several corroborating details. First, the temporal response is valuable information discriminating toxicity from nutrient limitations. Nutrient limitations typically do not result in rapid death; rather, growth is slow or diminished over time. Second, toxicity results are interpreted in the context of exposure. Chemical analysis of soils

is used to characterize the various constituents. These values are evaluated in reference to published literature and positive control responses to establish weight of evidence relationships between toxicity response and exposure to toxic materials.

COMMENT: ARCO commented that the analytical methods for determining the soluble and exchangeable fractions of metals in soils are inadequately described.

RESPONSE: The Assessment Plan, Part II, stated that soil samples will be collected from within the upper 6 inches. Ancillary soil parameters (including, but not limited to, organic matter, pH, N:P:K:, and texture) would be measured. Further, samples were analyzed for total metals and metalloid, soluble fraction (for As), and exchangeable fractions (for Cd, Cu, Zn, and Pb). The analytical methods are described in the Terrestrial Report of the Report of Assessment.

COMMENT: ARCO commented that the Plan failed to describe any protocols or criteria for the photographic and qualitative assessments. ARCO also commented that the Plan failed to provide any protocols or criteria for the examination or sampling of roots.

RESPONSE: The premise of ARCO's comments that qualitative and/or subjective information is of little value assumes that supporting quantitative and objective information is absent. The photographic record supports narrative descriptions taken in the field. A narrative description of plant cover, types of plants present, general appearance are clearly qualitative. This does not detract from the value of the information. The examination of roots likewise provides a qualitative view of conditions. It is not intended to be an exhaustive, quantitative survey.

The comment about the qualitative evaluation of vigor and overt symptoms of toxicity assumes that this is the only information to be gathered. The debate over qualitative evaluation of rangelands addresses a much different scale of impact than present in this assessment. Symptoms of phytotoxicity of concern

in this assessment include overt chlorosis, necrosis, and subnominal growth not found in moisture stress situations.

COMMENT: ARCO commented that the Plan failed to provide a sufficient level of detail on the methods proposed for the extended tests. ARCO also criticized the selection of plant species to be used in the tests. ARCO also commented that the Plan failed to state how the two exposure conditions (water-logged vs. non-water-logged) will be related to conditions in the riparian areas of the upper Clark Fork.

RESPONSE: The Plan indicated that the extended tests would be performed from those sample locations used in the Habitat Evaluation work. As a component of the test, reference soils are incorporated in the test procedure. Both *Populus* species and Douglas fir were selected to provide additional comparative information in support of the standard test species results. DOI specifically noted in its comments to the State that it supported the use of *Populus* in these tests. Because of limitations on the amount of soil collected, the water-logged exposures were not conducted.

Injury - Wildlife

COMMENT: ARCO commented that the approach to assessing injuries to terrestrial resources focused on proving previously established conclusions rather than using a hypothesis testing approach.

RESPONSE: The DOI regulations are designed to assess potential injuries to natural resources. Nevertheless, the conceptual approach of the injury assessment followed the scientific method, i.e.: observation, hypothesis formulation, data acquisition, and hypothesis testing. Initial field observations made by ecologists and discussions with local wildlife managers led to the testable hypothesis that injuries to terrestrial resources had occurred.

COMMENT: ARCO commented that there may be no reductions in wildlife habitat, and that habitats may be present although different from those originally present.

RESPONSE: Whether wildlife habitats were reduced or altered was determined in the performance of the assessment. The results are contained in the Terrestrial Report of the Report of Assessment. Significant alterations in habitat may represent injury.

COMMENT: ARCO commented that the wildlife protocols were not justified because there was no demonstrated injury or impact on wildlife populations or services.

RESPONSE: The assessment was designed to determine the nature and extent of injuries to wildlife. Extensive field observations and other information suggests that injury to wildlife habitat was widespread and locally severe in both the upland and riparian areas. The vegetation and wildlife protocols were designed to determine whether that hypothesis was correct (i.e. whether there were significant differences between impact and control areas in terms of vegetative community structure and composition and the ability of those plant communities to provide wildlife habitat). The results are contained in the Terrestrial Report of the Report of Assessment.

COMMENT: ARCO commented that the quantification of injury to wildlife should be based on wildlife population densities.

RESPONSE: The quantification of injury to wildlife need not be based on establishing population density estimates of indicator species. The use of HEP models in this process is in accordance with the DOI regulations. 43 C.F.R. 11.71(l)(8). The quantification of injury to wildlife may be determined based on adverse impacts to wildlife habitat.

COMMENT: ARCO commented that the use of HEP models is deficient because HEP only assesses the structural aspects of habitat.

RESPONSE: The use of HEP models is in accordance with the DOI regulations. 43 C.F.R. § 11.71(1)(8). Additionally, HEP models address more than the structural aspects of habitats. HEP models also address critical wildlife functions, such as breeding, feeding, and shelter, provided by habitats.

COMMENT: The Clark Fork - Pend Oreille Coalition and DOI commented that the wildlife plan only assessed injury for selected species.

RESPONSE: The wildlife species chosen for inclusion in the damage assessment are indicator species representative of those that may have suffered the greatest loss of habitat due to releases of hazardous substances. Additionally, the Habitat Layers HEP model used in the assessment allowed the State to construct lists of species that suffered habitat loss due to the release of hazardous substances. Thus, the HEP results for the indicator species will allow the determination of injury to particular wildlife habitats, while the Habitat Layers and Guild HEP model will identify vertebrate species dependent upon these habitats and the likely consequences of the observed forms of habitat degradation.

COMMENT: The Clark Fork - Pend Oreille Coalition asked what criteria were used to determine "indicator species."

RESPONSE: The term "indicator species" as used on page 9 of Part II of the Assessment Plan denotes species that, because of their habitat relationships, represent communities of wildlife species dependent upon the integrity of particular habitat types (montane coniferous forest, for example). Thus, pine marten habitat suitability indices represent the integrity of montane conifer forest habitat and its potential capacity to support its

indigenous faunal community. The selection of "indicator species" is in accordance with the DOI regulations. 43 C.F.R. § 11.71(1).

COMMENT: ARCO commented that sensitive species are useful only if they are a natural component of the ecosystem in question.

RESPONSE: 43 C.F.R. § 11.71(1)(2) indicates that the analysis of population changes or habitat changes should be based upon species or habitats that "can represent broad components of the ecosystem, either as representatives of a particular ecological types, of a particular food chain, or of a particular service" or "species, habitat, or ecosystems that are especially sensitive to the . . . hazardous substance and the recovery of which will provide a useful indicator of successful restoration" or "species, habitat, or ecosystems that provide especially significant services." The State's selection of both impacted species and habitat services conforms with the above guidance.

COMMENT: ARCO commented that concentrations of hazardous substances in prey organisms alone do not prove injury.

RESPONSE: As stated in 43 C.F.R. 11.62(f)(1)(i), relevant definitions of injury to wildlife species include concentrations of hazardous substances in prey organisms sufficient to cause adverse changes. Concentrations of metals in prey organisms were used in order to demonstrate exposure to wildlife, not injury to wildlife.

COMMENT: ARCO commented that the habitat studies will lead to double-counting because vegetation and soil analyses will be "performed and tallied separately."

RESPONSE: The State's methodologies for determining damages were designed to avoid double-counting. Damages for injuries to vegetation and soil were not determined separately from habitat suitability.

COMMENT: Regarding the proposed wildlife studies, ARCO commented that tissue analysis is neither necessary nor justified

because wildlife populations have been affected by poor wildlife management. ARCO goes on to say that wildlife populations have "recovered" to the point that most areas have as many species and numbers of wildlife as the habitat will support. Finally, ARCO states that no data support the inference that the condition of wildlife populations is worse in impacted sites than in unaffected areas.

RESPONSE: Tissue analysis was performed to confirm exposure of wildlife hazardous substances. The effects of wildlife management practices were considered by the selection of appropriate control sites. The State specifically investigated injuries to wildlife habitat because habitat, as the comment notes, can be limiting to wildlife populations. The determination of whether wildlife habitat was injured relative to control sites was made as a part of the assessment. The results are contained in the Terrestrial Report of the Report of Assessment.

COMMENT: ARCO commented that there is no basis for the assumption that a given concentration of metal within an organ or whole animal is sufficient to cause adverse effects. Moreover, ARCO states that no reliable determination of injury to consumers of aquatic biota has been made to justify these studies.

RESPONSE: Preliminary review of trapping data by the State indicated that otter were not present in the Clark Fork River, although they are present in other comparable rivers in Montana. This evidence, coupled with the documented absence of fish in the Clark Fork River and in Silver Bow Creek and elevated concentrations of metals and arsenic, provided ample justification for the State's assessment of injury to fish-eating mammals. With respect to ARCO's comment regarding tissue residues, residue analysis was performed in order to document exposures.

COMMENT: ARCO commented that the State failed to present methods or specifics on evaluation of physiological abnormalities in great blue herons.

RESPONSE: The State did not pursue its analysis of great blue heron nestlings. Most (if not all) piscivorous birds found along the upper Clark Fork River are seasonal occupants, migrating during the fall as far south as Central America and as far west as the Pacific coast. The evaluation of injury/residue data would be too ambiguous because of these confounding influences. Piscivorous birds residing along the upper Clark Fork River may feed principally from nearby lakes and streams, further adding confounding factors.

COMMENT: ARCO commented that the determination of metal residues in prey species does not accurately portray the physiological exposure of the predator species.

RESPONSE: The State does not agree with this comment. Metal residues in prey species do portray exposure conditions. When coupled with data on the amount and type of prey ingested, such data reflect ingestion of hazardous substances.

COMMENT: ARCO commented that any connection between residue concentrations in prey fish and changes in abundance in fish-eating birds is unreliable.

RESPONSE: The State agrees that such relationships may be problematic to establish. Hence, the State's injury claim focuses on the loss of riparian habitat critical for piscivorous bird species.

COMMENT: ARCO commented that time spent feeding on contaminated prey is not factored into the injury evaluations to birds.

RESPONSE: As noted above, the State's injury claim focuses on the loss of riparian habitat critical for piscivorous bird species.

COMMENT: ARCO commented that a State wildlife biologist was unable to identify any injury to wildlife at the Warm Springs Ponds.

RESPONSE: ARCO's comment does not fully and accurately summarize the testimony of the State wildlife biologist at his deposition. The wildlife biologist did not participate in this NRDA or any complete assessment of injury to wildlife at the Warm Springs Ponds. Nor did the biologist participate in any systematic study of wildlife at the Warm Springs Ponds. Finally the State did not seek to determine injury to wildlife at Warm Springs Pond.

COMMENT: ARCO commented that the method for determining injury to furbearers is deficient because it does not contain a method for determining at the outset whether there has been any adverse impact on populations.

RESPONSE: The State did not determine "at the outset" if injuries have occurred. The State's Plan developed a series of methods for making such a determination in the course of performing the assessment. As described in the Terrestrial Report of the Report of Assessment, impacts to otter populations were determined using (1) sign surveys, and (2) review of historical trapping records.

COMMENT: DOI recommended that caging and feeding studies be included in the assessment of injury to waterfowl and migratory birds.

RESPONSE: While laboratory toxicity studies could supplement the State's injury claim for birds, the State considered the time and costs involved in performing such studies and determined that these studies were not necessary because of difficulties in establishing exposures in migratory species. The State focused on the loss of riparian habitat critical for migratory bird species.

COMMENT: ARCO commented that the Plan fails to explain how baseline conditions will be established for consumers of aquatic biota.

RESPONSE: Baseline densities of consumers of aquatic biota at impacted streams were estimated using densities at appropriate

control streams. The densities of both the impacted and control systems were obtained using sign surveys, as described in the Terrestrial Report of the Report of Assessment.

COMMENT: ARCO commented that impact sites and terrestrial control sites should be similar in soil and geological substrate characteristics.

RESPONSE: The State does not agree that soil and geological substrate characteristics must be similar at impact and control sites. The selection criteria for control sites ensures that they would match the impact sites closely in topographical factors and all of the major environmental variables affecting the distribution of plant communities. These criteria are presented in the Terrestrial Report of the Report of Assessment.

COMMENT: DOI indicated that bird surveys should be coordinated with soil and vegetation studies.

RESPONSE: Bird surveys were performed at the same sites and approximately the same time where soil and vegetation data were collected.

COMMENT: The Clark Fork - Pend Oreille Coalition commented that the plan does not mention what stage of ecological succession will be used for baseline information at control sites.

RESPONSE: For each impact site a control site was chosen. Selection criteria for control sites included ensuring that the major factors which determine the distributions of plant communities are similar to the impact sites. Thus, the vegetative conditions prevailing on the control sites represent those that would have been found on the impact sites in the absence of large-scale mining activities.

COMMENT: The Clark Fork - Pend Oreille Coalition and ARCO requested that the term "grossly injured vegetation communities" be defined.

RESPONSE: The following criteria were used to define gross injury to vegetation: extensive elimination of the indigenous major plant association; little or no regeneration of the indigenous major plant association; and extensive topsoil exposure and erosion due to vegetation loss.

COMMENT: The Clark Fork - Pend Oreille Coalition requested additional information on those habitats that will be ground truthed and those that will be examined from maps and photographs.

RESPONSE: Areas suffering gross injury to vegetation were identified initially using both aerial photographs and/or field observations. All areas included in the assessment were ground truthed to confirm injury.

COMMENT: The Clark Fork - Pend Oreille Coalition commented that several grid systems should be developed for the terrestrial studies.

RESPONSE: The sampling grids for the upland impact and control areas were based on the Universal Transverse Mercator (UTM) grid which extends throughout the United States. Thus, several different grids were not necessary.

COMMENT: The Clark Fork - Pend Oreille Coalition questioned how the number of sampling grid points for terrestrial injury analysis was determined.

RESPONSE: Forty grid intersections were sampled in upland areas, as described in the Terrestrial Report of the Report of Assessment. This number of samples was selected because it was determined to be adequate to describe site variability.

An additional set of grid intersections (a direct offset of the original forty intersections) were surveyed for vegetation cover type and layers during 1994 in order to further reduce variability.

COMMENT: The Clark Fork - Pend Oreille Coalition commented that riparian sampling transects should extend beyond 50 meters on both sides of the river.

RESPONSE: The State modified its field protocols to extend the width of the transects to the furthest limit of the slickens area.

COMMENT: The Clark Fork - Pend Oreille Coalition commented that the causal relationship to metals-induced injury was unclear in the State's wildlife plans.

RESPONSE: The State related concentrations of hazardous substances in soils to phytotoxicological responses in plants. These toxicological responses, in turn, are reflected in injuries to wildlife habitats. There was no measure of direct metals-induced injury of wildlife.

Damage Determination - General

COMMENT: The Clark Fork-Pend Oreille Coalition requested clarification regarding the regulations and guidance followed by the economic damage determination section of Part II of the Assessment Plan.

RESPONSE: The damage determination methodologies were first identified in 1986 in the DOI regulations. 43 C.F.R. §§ 11.80-11.84 (1987). In Ohio v. U.S. Dept. of the Interior, 880 F.2d 432 (D.C. Cir. 1989), the DOI regulations, including aspects of the rule related to damage determination, were reversed and remanded to the agency. In 1991, DOI proposed revisions to the regulations to comply with the court's decision. 56 Fed. Reg. 19752 (1991). At the time Part II of the Assessment Plan was issued, final revisions to the regulations had not been issued by DOI. Accordingly, the State selected damage determination methodologies in accordance with the DOI regulations to the extent they remained legally applicable and utilized guidance provided by the court decision and the proposed revisions to the regulations where appropriate.

COMMENT: ARCO commented that the Plan failed to include a preliminary estimate of damages.

RESPONSE: The DOI regulations in effect at the time the Assessment Plan was issued did not require the State to develop a preliminary estimate of damages. Revisions to regulations proposed by DOI in April 1991 included a provision for the development of a preliminary estimate of damages. 56 Fed. Reg. at 19768, 43 C.F.R. § 11.35 (1991). However the preliminary estimate did not need to be in the Assessment Plan, rather it could be deferred until after the completion of the injury determination and quantification phase. Subsequently, the DOI regulations and this provision were made final.

The purpose of the preliminary estimate is to ensure that the damage assessment methodologies fulfill the requirements of reasonable costs. The State otherwise determined that its assessment costs were reasonable, which was also borne out by the results of the assessment.

COMMENT: ARCO commented that the Plan appears to invite impermissible double-counting and it later suggested criteria to avoid double-counting when using multiple methods. Finally, ARCO suggested that the State is not considering Superfund RI/FS actions, which will also lead to double-counting.

RESPONSE: The Assessment Plan did not invite double-counting and explicitly identified this issue in the Assessment Plan (page 29 of Part II). The State's use of multiple methods is clearly identified in the Plan as a means to provide multiple and confirming evidence to enhance the assessment, and not to double-count damages. The regulations explicitly state that multiple methods may be used. "Nothing in this section precludes the use of combination of valuation methodologies so long as the authorized official does not double count. . . ." 43 C.F.R. § 11.83(c)(2).

ARCO's proposed criteria to avoid double-counting are neither required by the DOI regulations nor are uniformly appropriate. The State took steps to ensure that the overlap across damage

estimation methodologies is identified and there is no double-counting. Lastly, the State specifically considered the anticipated effects of Superfund RI/FS response actions, and therefore avoided the potential for double-counting of these damages. 43 C.F.R § 11.84(c).

COMMENT: ARCO commented that the Assessment Plan failed to account for the impacts of remediation efforts and failed to identify the time period over which remediation and cleanup activities will take place.

RESPONSE: The Plan identifies that the State, through review of relevant documents and literature and interviews with appropriate state and federal personnel, will outline the anticipated Superfund RI/FS remediation actions for the major waste sources at the Clark Fork Sites, as well as characterize the residual natural resource injuries (Plan, Part II, page 31). Part of the characterization of residual injuries includes the assessment of the timeframe for recovery. This was done and is reported in various reports of the Report of the Assessment.

COMMENT: The Clark Fork-Pend Oreille Coalition asked about the use of a travel cost method for hunting and wildlife viewing.

RESPONSE: The State determined that a new travel cost model would not be cost effective to determine values associated with non-fishing recreation. Rather, the damage determination will address non-fishing recreation through the use of existing literature and data, much of which uses travel cost and contingent valuation methodologies; participation count data collected as a component of the fishing recreation survey; and, indirectly, through the Contingent valuation methodology survey. See Assessment Plan, Part II, Sections 4.4, 4.5.

COMMENT: ARCO made several comments on the market price damage assessment plans, including:

(a) In the market price analysis, alleged injury to groundwater or to surface water may not preclude, limit or reduce the services of those resources and, therefore, there may be no damages. Further, the damages are to be limited to "committed uses."

(b) The market price analysis will double-count damages. ARCO also suggests that the market price method should be preferred.

(c) The State does not indicate criteria for when the market price approach will be "deemed appropriate."

(d) ARCO also commented about the complications of measuring changes in use, or service flows, in computing service flows for groundwater and surface water market price analyses.

RESPONSE:

(a) The potential impact of resource injury upon services for the market price analysis was recognized in the Assessment Plan (see Part II, Section 4.6.3, page 46). The issue of "committed uses" is recognized in the Plan's steps to identify "designated uses or service flows" and to gather information "on past and present actual use to demonstrate that the resource has provided (or will provide) the use or service flow." Such information, in fact, was gathered. For example, in the Anaconda area, it is known that groundwater wells have been historically used for municipal, domestic and agricultural purposes. (See Konizeski, et al, 1968, *Geology and Groundwater Resources of the Deer Lodge Valley Montana*, USGS Water Supply Paper 1862; Hydrometrics, Feb. 1981, *Summary of Water Resources in the Vicinity of the Anaconda Company Pond System, Deer Lodge County, Montana.*) In fact, the City of Anaconda's municipal water supply comes from three groundwater wells drilled in the alluvial aquifer upgradient of the contaminated plume. (Peccia & Associates, 1991, *Anaconda Water System Improvements Program.*) In the Milltown area, groundwater wells surrounding the contaminated plume continue to supply drinking water to residents in the area. Prior to contamination, there were groundwater wells in the plume area which also were used

for drinking water purposes. In the Butte area there are more than 800 private and municipal wells. (See Well Inventory in Butte Mine Flooding Operable Unit Remedial Investigation.)

(b) As indicated in prior responses, and in the Assessment Plan, the State has undertaken multiple methods to provide confirming estimates. The State's plan explicitly identifies the need to not double-count damages, and the damage determination does not double-count damages.

The discussions in Ohio v. U.S. Dept. of the Interior and in the preamble to the proposed DOI regulations about the elimination of the hierarchy of methods clearly provide that the market price method need not be preferred if other methods are appropriate.

The court in Ohio v. U.S. Dept. of the Interior repeatedly identifies the limitations with the market price method. 880 F.2d at 442 & 462. "While it is not irrational to look to market price as one factor in determining the use value of a resource, it is unreasonable to view market price as the exclusive factor, or even the predominant one." 880 F.2d at 462 (emphasis in the original). The court also noted a warning against "making 'a fetish' of market value, since that may not be the best measure of value in some cases." 880 F.2d at 463 (citation omitted).

DOI has stated that market prices may not capture the full value of the resource. 56 Fed. Reg. at 19759. In addition, the regulations provide that the market price approach is only one of several accepted methods that may be used. 43 C.F.R. § 11.83(c)(2) and (3).

(c) The Market Price Method is appropriate where markets for the natural resources exist and are reasonably competitive. 43 C.F.R. § 11.83(c)(2)(i). But, that was determined not to be the case for any of the natural resources evaluated in this assessment.

(d) In cases such as this, where there are no widespread competitive markets, market price methodologies should not be used and other valuation methodologies should be considered. See 43 C.F.R. § 11.83(c)(2) and (3). Hence, a study analyzing such other valuation methodologies, including alternative market based

approaches and the factor price method, was undertaken to determine the value of groundwater use. See *Literature Review and Estimation of Municipal and Agricultural Values of Groundwater Use in the Upper Clark Fork River Drainage*, by Dr. John Duffield, Bioeconomics, Inc., March 18, 1994. In addition, an existing report, also prepared by Dr. Duffield, which utilized the factor price method, was used to determine the agricultural value of surface water.

Damage Determination - Recreational

COMMENT: The Clark Fork-Pend Oreille Coalition inquired about prolonged drought years as a possible confounding factor in the travel cost fisheries analysis and about the Clark Fork's reputation.

RESPONSE: Drought translates into reduced water flow and potentially reduced stocks. Changes in stocks, and to a lesser degree flow, were considered in the damage determination sections of the Assessment Plan and are addressed in the Aquatics Report of the Report of Assessment, and in the report entitled *Assessment of Damages to Anglers and Other Recreators from Injuries to the Upper Clark Fork River Basin*, (hereinafter, "Recreational Damage Report"). To the degree that drought in the spring and summer of 1992 had an impact on all streams and rivers, the relative quality of the rivers insofar as fishing pressure is concerned would be largely unaffected. However, overall fishing pressure may be reduced, relative to normal years, potentially biasing downward estimated damages. This bias is recognized in the aforementioned Recreational Damage Report.

Attitudes about the Clark Fork fishery (reputation) are expected to reflect the actual conditions versus other substitute sites. This was explicitly included in the Assessment Plan and in the analysis in the aforementioned Recreational Damage Report.

COMMENT: ARCO raised non-specific concerns that the State will use non-fishing recreation participation estimates from a 1979 University of Montana Master's thesis on the topic.

RESPONSE: The 1979 Master's thesis by Hagmann provided useful information. However, the Assessment Plan, Part II (page 40), was clear that this was only one set of information, and would be accompanied by new in-field observations conducted in tandem with the fishing study.

COMMENT: ARCO suggests restoration alternatives that concern remedies at the site should be considered, that a specific structured decision procedure should be followed, and that the restoration alternatives should be reduced to a list of "relevant" alternatives based upon selected factors. Further, ARCO suggests that the cost effectiveness and net benefit factors should, based upon economic theory, be given priority in selecting among alternatives. ARCO also suggests that technical feasibility should be weighted more heavily than other factors.

RESPONSE: The State's Plan clearly indicates that the restoration assessment will evaluate "injuries and damages that are residual to remediation." See Assessment Plan, Part II, Section 4.2.2, page 31. As noted in a response to a previous comment, this was done in the Restoration Determination Plan. Moreover, the Plan evaluated a full range of alternatives and then selected among alternatives based upon the factors identified in the regulations.

With regard to ARCO's comment that certain factors should be given more weight than others, the State has not followed this approach. Instead, the State, in accordance with the regulations, considered all the relevant factors and made "a selection that gives greater weight to some factors over others." 56 Fed. Reg. at 19759.

Specifically, the State considered a number of factors in its analysis of alternatives. These included: (1) technical feasibility; (2) the relationship of the expected costs of the

proposed actions to the expected benefits from the restoration, rehabilitation, replacement, and/or acquisition of equivalent resources; (3) cost-effectiveness; (4) the results of any actual or planned response actions; (5) potential for additional injury resulting from the proposed actions, including long-term and indirect impacts, to the 32 injured resource or other resources; (6) the natural recovery period; (7) ability of the resource to recover with or without alternative actions; (8) potential effects of the action on human health and safety; and (9) consistency with relevant federal, state, and tribal policies; and (10) compliance with applicable federal, state, and tribal laws. 43 C.F.R. § 11.82(d). The State considered all of the factors as appropriate in its analysis. It did not give a pre-determined weight to any one factor.

COMMENT: ARCO raises issues about the appropriateness of using existing data and study results in natural resource damage assessments. Specifically, ARCO expresses concern over the use of existing data to support the recreational fishing damage determination as well as the non-fishing recreation damage determination and whether the design and analysis used in the underlying studies are valid and whether the underlying studies can be utilized in the Clark Fork NRDA.

RESPONSE: The use of existing data and studies is allowable and encouraged in many sections of the DOI regulations. Use of such data and studies provides a cost effective means to undertake many assessment tasks, and to provide added data and information for the assessment. The transferability and validity of existing studies is necessarily considered in determining whether existing data can be used. While data from existing studies was not perfectly suited to all of the analyses, the State used such data when the data was judged to be cost effective relative to undertaking new studies to collect the same or similar data and where prior results are technically appropriate for providing data of acceptable accuracy.

As identified in the Assessment Plan, Part II (see Section 4.3.3.1, page 34) regarding recreational fishing, existing data would be evaluated for its applicability to guide decisions on the design of new studies and to support the analyses and results of new studies. In fact, while by necessity existing data was used in designing the study (as is the case for any study), the Recreational Damage Report was based essentially on data produced as part of the study. The only part of the report which relied to a significant degree on existing data was Chapter 8, dealing with non-fishing recreation. This was justified by the high reliability of the existing data and as a result of the correlations developed between existing non-fishing recreation data and new data, for both fishing and non-fishing recreation developed as part of the study.

COMMENT: ARCO raised several specific technical concerns with respect to the multi-site recreational fishing model, data collection and analysis as described on pages 34-37 of the Assessment Plan, Part II. These include:

- (a) ARCO expressed concern about the representativeness of the sample of visits and visitors.
- (b) ARCO expressed concern that the conduct of the survey during summer months will provide no basis for determining damages for other months or will lead to biased damage estimates for other months.
- (c) ARCO suggested that failure to participate in the follow-up surveys will lead to biased results.
- (d) ARCO suggested that recall bias may occur in the follow-up surveys.
- (e) ARCO expressed concern about the implementation of other technical issues in such models, including the measurement of the opportunity cost of time, the role of multipurpose trips, the choice of site characteristics, and the relationship between perceptions and technical measures of quality.

RESPONSE: The issues raised by the comment are routinely addressed in multi-site recreational fishing model studies and have

been addressed in the Assessment Plan and in the Recreational Damage Report of the Report of Assessment.

Specifically:

(a) The Assessment Plan called for a rigid sampling procedure to intercept anglers through the day, week and season. Statistical adjustments for any bias due to the intercept sampling approach have been specifically accounted for in the intercept survey literature and in the analysis.

(b) The survey was planned and conducted to coincide with the majority of river use that occurs in the late spring and summer months. Extrapolation to the reduced use levels in other months were based upon available monthly activity statistics.

(c) Based upon prior fishing surveys, the State expected and received very high response rates to the fishing survey. As a result, non-response biases, if any, were minimized and are addressed in the analysis.

(d) The Assessment Plan called for follow-up surveys. To minimize potential recall bias and to implement a cost effective assessment, follow-ups were conducted at four to six week intervals.

(e) Each of the other technical concerns raised are issues traditionally addressed in almost all travel cost models. Each of these issues were specifically addressed in the State's travel cost model in a manner consistent with the established literature for the conduct of such models.

COMMENT: ARCO's comments on the recreation use valuation raise issues about the implications of the Duffield and Allen (1988) study for the Clark Fork River and Silver Bow Creek, the validity of this type of data for use in a "with versus with-out" approach to measure natural resource damages, and how substitutes will be considered in the analysis.

RESPONSE: In the Assessment Plan, the Duffield and Allen study was used to illustrate the potential for significant damages in the Clark Fork River Basin. New studies, as identified in the

Assessment Plan, were designed and implemented to go beyond the existing studies as a basis for making a damage determination. These studies examined fishery resources at sites with and without impacts from hazardous substances, and explicitly considers substitution in and out of trout fishing in Western Montana. These studies are reported in the Recreational Damage Report of the Report of Assessment.

COMMENT: ARCO commented on the recreation use value studies that relevant substitutes be considered beyond other trout fishing sites, including non-trout fishing, non-fishing recreation and non-recreation activities. ARCO suggested that these factors are omitted and will bias the results.

RESPONSE: The multi-site recreation model outlined in the Assessment Plan, and as reported in the Recreational Damage Report of the Report of the Assessment, addresses the role of substitute sites as well as the alternative of not fishing for trout in Western Montana. This non-fishing alternative includes all other activities. This is accomplished through a nested logit framework where one of the nests (levels of decisions) is whether to fish for trout or whether to undertake other activities. Another nest is, if one decides to fish for trout, which set of sites to fish at, and then finally at which specific site to fish at. As a result, the analysis is not subject to the omissions suggested and is not biased as is suggested.

COMMENT: ARCO makes a general comment that "the basis for selecting sites in the [recreational fishing] survey is inadequate."

RESPONSE: The Assessment Plan provided a variety of characteristics that were the basis on which to select sites, and the Plan provides a preliminary listing of sites. Further detail is provided in the Recreational Damage Report of the Report of Assessment. ARCO provides no substantiation that the basis for

selecting sites is inadequate. The State believes the criteria used are adequate.

COMMENT: ARCO commented that fish stocks should be related to hazardous substances, water flow, temperature and all other factors. ARCO seems to be suggesting that the State intends to attribute all variation in fish stocks to hazardous substances regardless of other site factors. ARCO further suggests that how changes in fish stocks will be determined is not explained.

RESPONSE: The economic damage determination utilizes the results of the injury determination and quantification as the basis for computing fishery damages. The injury assessment was specifically designed to account for confounding factors influencing stocks.

COMMENT: ARCO raised general questions about what non-fishing injuries will be measured and included to develop a damage claim.

RESPONSE: The general types of non-fishing injuries and service flows to be considered are identified on page 39 of the Assessment Plan, Part II. These included swimming, boating, hiking, photography, picnicking, and camping. More detailed specifications of the resources, locations and service flows were subject to the completion of the injury determination phase, but this did not substantially impact the general assessment approach outlined. The results are contained in the Recreational Damage Report of the Report of Assessment.

COMMENT: ARCO raised additional concerns about the non-fishing recreation analysis including:

(a) The determination of comparable sites was not adequately defined.

(b) Non-fishing recreation may occur in geographic locations and times different from fishing recreation, and therefore, performing some of this analysis concurrent with the fishing surveys may be inadequate.

- (c) The Plan assumes there are wildlife injuries.
- (d) The sampling plan is not described.
- (e) A follow-up survey will be insufficient, if not seriously biased.

RESPONSE: The stated concerns do not represent significant problems with the Assessment Plan. Specifically:

(a) The collection of non-fishing recreation data was planned and executed at each of the sites in the fishing intercept survey. Collectively, the entire set of sites provides a composite picture of non-fishing recreation at a broad range of comparable and substitute sites.

(b) Limiting the on-site non-fishing data collection to the fishing sites and time periods does miss impacts to non-fishing recreation at other sites due to injuries at other sites. Therefore, the damage determination using this approach has an acknowledged downward bias, i.e. the damages may be underestimated. More extensive in-field efforts were not considered to be cost effective.

(c) The damage determination assessment plan assumed the potential for wildlife habitat and wildlife injury to present how the damage determination could proceed once injury was assessed. The individual assessment of consumptive and non-consumptive wildlife recreation away from rivers, as identified in Part II, Section 4.4.3(b), was not undertaken. However combined use and non-use values are specifically included in the Contingent Valuation Report of the Report of Assessment, which more fully measures these values.

(d) The data collection procedures are generally outlined in the Assessment Plan, Part II, Section 4.4, and specifically outlined in the Recreational Damage Report of the Report of Assessment.

(e) The follow-up survey was not biased. To be cost effective, follow-up survey questions were incorporated into the recreational fishing data collection surveys and into the contingent valuation survey instrument.

COMMENT: ARCO expressed general concern over limitations with the use of unit-day values based upon prior studies in general, and particularly for the non-fishing recreation damage determination. ARCO suggested that ranges of possible values should be reported.

RESPONSE: The unit day method is specifically identified as a use valuation methodology in the existing DOI regulations, 43 C.F.R. § 11.83(c)(2)(vi). Application of such values must recognize issues of transferability. This is consistent with the State's Assessment. The ARCO suggestion that ranges of possible values be reported is consistent with standard practice when multiple appropriate values are available, and it is consistent with the State's approach.

COMMENT: ARCO expressed concern with the inclusion of CVM questions in the follow-up fishing survey asserting that the added questions are unnecessary and that the CVM method is unreliable. ARCO also stated that the survey may be biased due to a higher response rate by active participants

RESPONSE: The addition of a CVM question in the survey provided multiple avenues with which to address and validate use value damages and therefore enhanced the ability of the State to thoroughly determine damages. Specifically, the CVM question allowed investigation into the correlation between observed, modeled and stated intentions concerning participation and site choice to collaborate the estimation of participation impacts due to changes in site quality. It should be noted that willingness-to-pay CVM questions for changes in fishing in Montana are available in the literature.

With respect to the reliability of contingent valuation, DOI has stated that [w]hen CVM is used to quantify use values alone, it is judged to be just as reliable as the other nonmarket valuation methodologies." 56 Fed. Reg. at 19762.

Addressing the potential for biases due to higher survey participation rates by one sample group (in this case very active anglers) is a routine practice in survey data analysis. This issue

was addressed in the Recreational Damage Report of the Report of Assessment.

Damage Determination - Contingent Valuation Methodology

COMMENT: The Clark Fork-Pend Oreille Coalition questioned whether the Contingent Valuation Methodology (CVM) survey would consider variations between stated and actual actions, and wanted to review the CVM survey instruments and plans as they were developed.

RESPONSE: As discussed in the literature, previous applications of the CVM method have correlated stated and actual actions (see for example, Mitchell and Carson. These comparisons do not suggest that any standard adjustment between stated and actual actions exists or is appropriate.

All aspects of the CVM were peer reviewed and the CVM was designed, implemented and analyzed in a manner consistent with standard practice. Additional public comment periods on damage assessment methodologies are not required by the DOI regulations and could not be accommodated given the various time constraints the State was under.

COMMENT: ARCO commented that the economic methodologies, and the contingent valuation methodology in particular, identified in the Assessment Plan were deficient and would result in a determination of damages that was speculative. ARCO cited several studies that it stated raised significant concerns about the contingent valuation methodology. Further, ARCO raised questions about specific design issues in contingent valuation methodology instruments, such as substitute sites and incorporating remedies being undertaken.

RESPONSE: All of the economic methodologies identified in the Assessment Plan are listed in the DOI regulations. Furthermore, the contingent valuation methodology was specifically upheld by Ohio v. U.S. Dept. of the Interior. In that case, the court stated:

Industry petitioners complaint is limited to DOI's inclusion of CV in its assessment methodology. They claim fatal departures from CERCLA on grounds that CV methodology is inharmonious with common law damage assessment principles, and is considerably less than a "best available procedure." These petitioners further charge that DOI's extension of CERCLA's rebuttable presumption to CV assessments is arbitrary and capricious, and violative of the due process rights of a potentially responsible party. We find none of these challenges persuasive.

880 F.2d at 476 (footnotes omitted).

The court added, "we find DOI's promulgation of CV methodology reasonable and consistent with congressional intent, and therefore worthy of deference." 880 F.2d at 476-77.

The DOI regulations provide the "best available procedures" to assess natural resource damages. Nevertheless, DOI recognized that no science, including damage determination is exact. Thus, the DOI regulations expressly allow for consideration of uncertainty in the damage determination. 43 C.F.R. § 11.84(d). The State considered and accounted for uncertainty in the Report of Assessment.

COMMENT: ARCO cites issues and problems in selected contingent valuation studies. The cited studies, which were sponsored by industry (Exxon and the American Petroleum Institute in particular), are unpublished and are not peer reviewed. While the studies are of interest, the studies and results suffer from many conceptual, theoretical, design, implementation, and analytic deficiencies that are not standard practice.

RESPONSE: The State's contingent valuation methodology design plan uses standard contingent valuation methodology practice and addresses many of the issues raised by, and deficiencies in, the studies cited by ARCO. In particular, the State's contingent valuation methodology design plan identifies issues such as restoration, geographic extent of injuries, and other factors as among the factors to be considered in the design. The contingent valuation methodology design is part of the Assessment Plan and

could not be, nor need be, specified in more detail in the Assessment Plan.

Furthermore, any comprehensive natural resource damage assessment must consider nonuse values. Contingent valuation methodology is currently the only accepted method to determine nonuse values, and a failure to determine nonuse values could be viewed as an unacceptable deficiency in the assessment. See Utah v. Kennecott Corp., 801 F.Supp. 553 (D. Utah 1992).

Damage Determination - Restoration

COMMENT: ARCO claimed that the State improperly failed to develop a Restoration and Compensation Determination Plan. In a related comment, ARCO asserted that as a result of this failure, any determination of compensable value will be flawed. ARCO also objected to the level of precision of the restoration costing methodologies.

RESPONSE: The provisions for a Restoration and Compensation Determination Plan (RCDP) were initially contained in proposed revisions to the DOI regulations issued in 1991. 56 Fed. Reg. 19752, proposed 43 C.F.R. §§ 11.80-11.84. These provisions were not in effect at the time the State issued its Assessment Plan. Nevertheless, the State used the proposed revisions as guidance in planning its restoration analysis. Accordingly, the Assessment Plan, Part II provided a description of various cost-estimating and valuation methodologies. In addition, Part II identified the approach the State intended to use in developing and selecting restoration alternatives. With the release of the Report of Assessment, the State is issuing a Restoration Determination Plan, which contains all remaining elements of the Restoration and Compensation Determination Plan.

The restoration costing methodologies used by the State were all identified by DOI as standard and accepted methodologies in its proposed revisions to the regulations. These "cost estimating" methodologies range from general to comprehensive estimates. The accuracy of the estimate depends upon the amount and quality of

information available to prepare the estimate. 56 Fed. Reg. at 19758.

COMMENT: ARCO commented that the Assessment Plan makes no mention of the "grossly disproportionate" test in the restoration alternative selection process.

RESPONSE: There is no explicit "grossly disproportionate" test in the regulations. While such a criteria was possibly allowed for by Ohio v. U.S. Dept. of the Interior, the proposed regulations provide that all of the factors contained in 43 C.F.R. § 11.82(d) provide the basis for the trustee to determine whether an alternative is grossly disproportionate. DOI has indicated:

The Department agrees that there should not be a numeric standard imposed upon a trustee to make a "grossly disproportionate" determination for establishing natural resource damages. The proposed revisions provide that the decision making process include factors that help keep in balance the several possible elements of the damage assessment, all of which would be added together to arrive at the damage claim.

56 Fed. Reg. at 19765.

Thus, "these factors, when considered together, would encompass the "grossly disproportionate" determination suggested by the court." 56 Fed. Reg. at 19758.

COMMENT: ARCO suggests that in its discussion of restoration methodologies the Assessment Plan improperly "focuses upon specific resources rather than the services those resources provide." ARCO argues that the State should consider only restoring affected service flows of the resources, and not the resources themselves. ARCO also suggests that this is required by the regulations and is consistent with the economic theory of economic efficiency. Further, ARCO expresses concern that the State's assessment fails to clearly delineate the potentially affected services.

RESPONSE: The State's Assessment Plan states that the State will restore both resources and resource service flows

(Section 4.2.2 on page 32 of Part II). Throughout the Assessment Plan, Part II, the State identifies the types of service flows that are expected to be impacted. Consistent with Ohio v. U.S. Dept. of the Interior and the DOI regulations, the State does not intend to limit its analysis to only the restoration of quantified resource service flows, as it appears ARCO would require.

ARCO's view of the importance of services vis a vis restoration has been expressly rejected by DOI. In response to a comment advancing the same position ARCO advances here, DOI stated, "although it is the natural resource that trustees are restoring, restoration of that resource causes an increase in services. . . . 58 Fed. Reg. 39340. Accordingly, trustees are charged with restoring actual natural resources not "the abstract services provided by a resource." Id.

The notion that restoration of resources and services go hand-in-hand is confirmed by the regulations themselves. DOI regulations clearly provide that both the resource and its services should be restored. "For example, 43 C.F.R. § 1180(b) (emphasis added) provides the measure of damages is the cost of restoration, rehabilitation, replacement, and/or acquisition of the equivalent of the injured natural resources and the services those resources provide. . . ." 43 C.F.R. § 11.81(a) provides that the Restoration Compensation and Determination Plan should list "a reasonable number of possible alternatives for restoration, rehabilitation, replacement, and/or acquisition of equivalent resources and the related services lost to the public. . . ."

In keeping with the regulations and the clear expressed intent of DOI, the State relies on restoration of resources to restore services.

COMMENT: ARCO suggests that the Assessment Plan requires the State to select one or more restoration alternatives before determining the value of the lost services resulting from the injuries to the natural resources, and therefore it cannot make these decisions with the requisite information.

RESPONSE: The Assessment Plan called for the restoration component of the damage determination to be conducted concurrently and in concert with the injury quantification. The Restoration Determination Plan considers various alternatives. A selection of alternatives is the concluding step in the damage determination. Therefore, the State will have the available requisite information with which to select restoration alternatives.

Quality Assurance Project Plan (QAPP)

COMMENT: One comment stated that the relationship between the QAPP and data collected for the Superfund RI/FS process was unclear.

RESPONSE: The QAPP was written to address data being collected for the NRDA. Data collected for the Superfund RI/FS process was collected under other project-specific Quality Assurance/Quality Control plans. These data are considered usable for the NRDA unless it was rejected by previous data validation as a part of the Superfund RI/FS process. Data review and validation criteria for the NRDA are detailed in Sections 10.3 and 11.0 of the QAPP.

COMMENT: ARCO commented that U.S. EPA rejected expansion of control limit windows in the Superfund RI/FS process.

RESPONSE: The QAPP for the NRDA contained expanded control limit windows for data quality objectives for soil matrices. U.S. EPA previously rejected expansion of control limit windows for soils because the statistical justification was not sufficiently developed. U.S. EPA did not reject the concept of expanded windows that had sufficient statistical justification. Nevertheless, the data for the NRDA was evaluated based on the existing windows. The expanded windows were not used.

COMMENT: One comment requested a complete table of laboratory analytical methods and analytes/media.

RESPONSE: All analytical methods are in the Administrative Record of the Report of Assessment.

COMMENT: Another comment indicated confusion with units of measurement expressed in the QAPP.

RESPONSE: Units of measurement are stated in the final Report of Assessment, and are consistent (e.g., ppm vs. mg/kg), as much as is practicable and appropriate (considering items such as magnitudes of analyte concentrations, matrices, etc.).

COMMENT: Another comment questioned the incorporation of chloride and total sulfate in the groundwater and surface water analysis.

RESPONSE: Chloride and sulfate can be important in evaluating sources of contamination to surface water and groundwater. Analytes listed in the QAPP may not have necessarily been used in the groundwater and surface water assessment work. For example, chloride was not analyzed in the groundwater samples collected for the NRDA.

COMMENT: ARCO commented that detection limits were not specified for non-metal analytes and that sampling procedures and standard operating procedures were not included.

RESPONSE: Detection limits for the non-metal analytes listed depend on the analytical method used, the sensitivity of the analytical instrument used in the analysis, and the objectives of the research being conducted. For these reasons, detection limits may not always be the same. Project-specific detection limits are identified in the Report of Assessment. Sampling protocols and standard operating procedures are contained in the Laboratory Analytical Protocol (LAP) in the Administrative Record and in the various injury assessment reports.

COMMENT: ARCO commented that preservation and holding times were for aqueous samples only.

RESPONSE: The preservation and holding times in the Assessment Plan are appropriate for aqueous samples. Samples which are collected for other matrices may require different containers, sample preservation and holding times. As stated in the QAPP, methods of analysis will follow EPA or other acceptable methods and are included in the LAP in the Administrative Record.

COMMENT: A comment questioned what procedures would be used if initial and continuing calibration get "out of control."

RESPONSE: Target limits for initial and continuing calibration standards are specified in Table A-1 of the QAPP. If samples in the analytical run exceeded these limits, they were reanalyzed, or the resulting data were qualified through the data validation process.

COMMENT: ARCO commented that analytical spike and matrix spike quality control (QC) limits should be specified.

RESPONSE: The matrix spike recovery is $100 \pm 25\%$ for water samples, and the matrix spike duplicate is <20% relative percent difference (RPD) for water.

COMMENT: ARCO commented that "Kimmwipes" should not be used for the cross-contamination swipe because of possible sulfur contamination.

RESPONSE: Kimmwipes were not used for swipe samples; ashless, analytical grade filter paper was used.

COMMENT: A comment indicated the need for sufficient sample sizes and blind evaluation in the laboratory.

RESPONSE: Sufficient samples were collected to allow for sample splits and reanalysis. To the extent practicable, sample location information was not provided to the laboratory, unless such information was necessary to avoid potential problems during the sample analysis.

COMMENT: Another comment questioned the use of the word "may" in application of QC.

RESPONSE: The word "may" implies that these QC sample types may or may not be appropriate, depending on the kinds of samples being collected (i.e. the sampling matrix) and the methods used for sample collection. When appropriate, some or all of these samples were incorporated into the sampling effort at the minimum frequencies specified in the QAPP.

COMMENT: Another comment stated that the data quality objectives (DQOs) indicated in Table A-1 of the QAPP were confusing. Two comments requested additional information about data justification and validation.

RESPONSE: The QAPP and the DQOs arrayed in Table A-1 apply to data collected under this QAPP. Data validation included commonly accepted statistical review by a qualified and experienced data validator. Data were qualified by assessing compliance with specific data validation criteria. Data which did not meet QC target limits were qualified and limitations to their use noted. Qualified data were considered fully usable unless specifically rejected. Rejected data may be considered useful for some project objectives.

COMMENT: A comment requested additional information on the analytes Mo, Cl, and SO₄²⁻.

RESPONSE: Molybdenum, chloride and sulfate can be useful in characterizing groundwater quality and sources of contaminated to groundwater.

COMMENT: Another comment questioned quality control procedures for field sampling and measurements.

RESPONSE: Sample collection methods were designed or selected so that samples were representative of the media being sampled. Some media may be more homogeneous than other media, and that the

homogeneity of a medium is often not known before sampling is conducted. The inclusion of field replicate samples in a sampling program is one way of estimating the homogeneity of the medium and the replicability of the sampling method. Field replicates provide information about total variability due to sample collection, sample analysis, and medium heterogeneity. Quality control procedures for field sampling included the collection of field blanks (i.e., trip blanks, decontamination blanks, among others) to assess potential sample contamination.

COMMENT: Another comment indicated that consideration should be given to not using trip blanks for bottle blanks, and that bottle blanks be determined on each lot.

RESPONSE: Trip blanks can provide the same information as bottle blanks because a trip blank that shows no contamination demonstrates that the sample container was not contaminated. Bottle blanks were analyzed as appropriate.

COMMENT: ARCO stated that the QAPP should include examples of chain of custody records and sample analysis request forms.

RESPONSE: Analytical procedures are included in the Administrative Record, within the LAP.

COMMENT: ARCO also stated that the QAPP should include analytical procedures or a laboratory analytical protocol plan.

RESPONSE: Analytical procedures are included in the Administrative Record, within the LAP.

COMMENT: Several comments questioned the targets for accuracy and precision and expanded analytical windows in the QAPP.

RESPONSE: The expanded analytical windows that were proposed in the Plan were the limits that ARCO requested in the Superfund RI/FS process for soil matrices. Nevertheless, as explained in a previous response, the expanded windows were not used. The U.S.

EPA CLP limits for accuracy and precision have been accepted for use on NPL sites and were used in the assessment.

COMMENT: Another comment questioned the phrase "little or no QC."

RESPONSE: Some measurements have no established QC limits, but they are necessary to supplement other data. For example, pH and conductivity require only a meter calibration to known standards. These are considered a measurement rather than an actual analytical method that can be assessed by evaluating a number of different validation criteria.

COMMENT: ARCO commented that specific QAPP elements required by federal guidance were not included in the Assessment Plan.

RESPONSE: The U.S. EPA Interim Final Guidance for conducting remedial investigations and feasibility studies under CERCLA (OSWER Directive 9355.3-01, October 1988) does not provide required QAPP elements. It lists 14 elements that should be included in a QAPP. These elements were reviewed and included in the QAPP, as appropriate.

COMMENT: ARCO also suggested that detection limits are too high relative to U.S. EPA's CLP.

RESPONSE: All detection limits meet the CLP with the exception of arsenic, lead, selenium, and thallium. The U.S. EPA Contract Required Detection Limits (CRDLs) are detection limits obtained in pure water. The CRDLs provide that limits for samples may be considerably higher depending on the sample matrix. The limits for arsenic, lead, selenium, and thallium were based on the practical analytical limits by Inductively-Coupled Plasma Emission Spectrometry (ICP) for analysis of fine-grained streambed sediments.

COMMENT: ARCO questioned the data quality objectives for RPD.

RESPONSE: The RPD limits are not \pm as indicated in ARCO's comment. An RPD is correctly stated as a <, "less than", value because RPD calculations are performed using absolute quantities.

COMMENT: ARCO indicated that laboratory control samples (LCS) should be analyzed at a frequency of 1 for every 20 samples in a sample delivery group or 1 for each sample delivery group, whichever is most frequent.

RESPONSE: The LCS employed was approximately 1/20 for water, soils, and fish tissue digestions.

COMMENT: DOI suggested that sufficiently low detection limits be utilized to ensure that all amounts of hazardous substances were identified.

RESPONSE: The State identified minimum project detection limits in its QAPP. In most cases, laboratories achieved lower detection limits.

COMMENT: The Clark Fork - Pend Oreille Coalition questioned whether modifications to sample collection procedures would result in changes in QA/QC procedures.

RESPONSE: Field modifications to sampling SOPs were noted in field notebooks and initialed by field personnel, as provided for in the QAPP. This did not result in alterations to the overall QA/QC procedures established in the QAPP.

Assessment Plan - Part III

COMMENT: The Confederated Salish and Kootenai Tribes commented that Assessment Plan Part III does not address injuries to natural resources subject to Confederated Salish and Kootenai Tribes' trusteeship.

RESPONSE: The State's assessment addresses natural resources for which it is trustee, which may or may not include natural resources for which the Tribes' are trustee. The State limited the scope of its assessment based on information available at the time

the State initiated its assessment and in order to focus its efforts. Furthermore, the identification of off-reservation natural resources for which the Tribes are trustee is not straightforward. Resolution of Tribal trusteeship issues are, in the final analysis, for a court to decide.

COMMENT: The Confederated Salish and Kootenai Tribes commented that the purposes of the additional data gathering activities described in Assessment Plan Part III are not clearly stated. The Tribes state that this makes it difficult to assess the appropriateness and/or adequacy of the proposed data collection design. It was recommended that for each task that is being undertaken the specific purpose should be clearly stated, and the specific uses to which the collected data will be put should be provided.

RESPONSE: Additional data gathering activities were undertaken as part of the State's assessment of injury to aquatic resources. For each of the six tasks described, an objective is identified. In general, these tasks were deemed to be useful for the purpose of further evaluating injury to fish populations in the Clark Fork River, and for better understanding other factors besides the presence or absence of hazardous substances that could affect trout populations in the Clark Fork River and control streams. Comments concerning the specificity of stated data collection objectives and uses of collected data for the specific tasks described in Part III are responded to below.

COMMENT: The Confederated Salish and Kootenai Tribes commented that it was not clearly stated what data were lacking about seasonal variations in trout populations, making it impossible to determine whether the planned trout population surveys would provide the information necessary to fill the data gap. The necessity of evaluating seasonal variation in trout populations was also questioned, given that the State had already made estimates of damages.

RESPONSE: As the comment notes, the State had already made estimates of damages (based on injuries to trout populations), prior to the release of Part III. The damage estimates were based on trout population data collected by the State in 1991 specifically for the purpose of the damage assessment. In the 1991 trout population survey, data were collected during the summer (roughly July through August) from fish population sites on Silver Bow Creek, the Clark Fork River and control sites. By definition, a one-time survey cannot provide the data necessary to statistically calculate seasonal variation. Moreover, the State did not intend to statistically evaluate seasonal variation which would have required surveys to be conducted four times a year (spring, summer, fall and winter. Rather, the task was intended to evaluate seasonal influences on trout populations as opposed to season variation. Consequently, the State conducted a "repeat" population survey (three to four surveys) between June and September to evaluate seasonal influences on trout populations.

COMMENT: The Confederated Salish and Kootenai Tribes questioned whether the proposed design sufficed to evaluate seasonal variation in trout populations, and why sampling was not envisioned for the period of October through May.

RESPONSE: As noted in the previous response, the objective of trout population surveys was not to evaluate seasonal variation, but instead seasonal influences or effects. To evaluate seasonal influences, surveys began in June (towards the end of spring runoff) and continued into September. Within this timeframe of sampling, a wider range of water quality conditions (for example, dissolved oxygen and water temperature) were encountered under a one-time sampling such as was conducted in 1991. Dissolved oxygen and water temperature may affect trout populations.

COMMENT: The Confederated Salish and Kootenai Tribes questioned the rationale for the selection of reaches used for the fish population survey work.

RESPONSE: Reaches near Racetrack Creek, Little Blackfoot River, Flint Creek and Rock Creek were selected because these four significant tributaries to the Clark Fork River could provide refuge for Clark Fork River trout that may seek cooler water temperatures during the summer. Trout that migrate from the Clark Fork River to these tributaries under such conditions would obviously affect population estimates in the Clark Fork River. These four reaches also extend virtually the entire length of the Clark Fork River, thereby providing a more complete picture of seasonal influences on trout populations than would one or two sites. Reference stream reaches were also surveyed to assess whether trout populations respond to seasonal changes in water quality in a way similar to trout in the Clark Fork River.

COMMENT: The Confederated Salish and Kootenai Tribes questioned why snorkeling and electrofishing (electroshocking) methods were being compared, and requested information about the study design that would be used to compare the methods.

RESPONSE: Snorkeling is a method of counting trout by directly observing and counting trout underwater. This method was used by the State in the damage assessment. Electroshocking is another method of counting trout. The State thought it might be useful to compare the two methods. However, this task was not undertaken because of concerns that it would prove too stressful to the fish.

COMMENT: The Confederated Salish and Kootenai Tribes requested information as to what questions water temperature and dissolved oxygen data were going to answer, and how these data would be used to answer these questions, and whether the proposed sampling design is considered sufficient to answer these questions.

RESPONSE: Water temperature data were collected for two purposes: 1) to evaluate the difference or similarity of surface water temperatures between the Clark Fork River and control streams used in fish population surveys, and 2) to aid in the

interpretation of the repeat trout population surveys. For the first purpose, continuous recording water temperature loggers were deployed at reaches in the Clark Fork River and in matched control streams used in the fish population surveys. For the second purpose, continuous recording water temperature loggers were deployed at locations in the Clark Fork River near tributary streams, and in tributary streams to which Clark Fork River trout might migrate if water temperatures influenced trout populations. Data loggers were deployed from June through September, consistent with the timeframe of the repeat trout population surveys.

Dissolved oxygen data were collected to compare of the Clark Fork River and its control streams. A limited amount of sampling was envisioned to occur during the early morning hours, when dissolved oxygen concentrations are generally at their lowest, on control streams. The limited amount of sampling, restricted to control streams only, was deemed to be sufficient for making a comparison.

COMMENT: The Confederated Salish and Kootenai Tribes questioned the purpose of the trout gut content analysis, and how the data collected would be used to answer these questions.

RESPONSE: Trout gut content analysis would further document the exposure of trout in the Clark Fork River to hazardous substances via the food-chain pathway. There are little or no available data on measured concentrations of hazardous substances in trout guts.

COMMENT: The Confederated Salish and Kootenai Tribes questioned the meaning of the phrase "characterize" dissolved organic carbon, and why it was necessary to characterize dissolved organic carbon only in the Clark Fork River but not in reference streams. Clarification on the timing of sampling (August low-flow) was also requested.

RESPONSE: The word "characterize" simply meant obtaining enough data to be able to describe surface water quality in the Clark Fork River with respect to dissolved organic carbon. A one-

time sampling of a number of stations along the entire length of the river from Warm Springs to Turah would provide more information than already existed. Because dissolved organic carbon ameliorates the toxicity of certain metals, and because metals are largely absent from reference streams, data collection focused on the Clark Fork River, which contains injurious concentrations of metals. The timing of sampling for this task was not particularly important. August low-flows were selected because samples had previously been collected during spring runoff in 1992 and it was thought useful to have data from two different flow regimes.

COMMENT: The Confederated Salish and Kootenai Tribes questioned how the analysis of hazardous substances in periphyton collected from riffle environments would be used.

RESPONSE: These data provide further documentation of the exposure of benthic macroinvertebrates, the primary diet of trout, to hazardous substances. These data also strengthened the linkage between contaminated bed sediments and benthic macroinvertebrates by directly documenting the severity of contamination of the riffle environment that many benthic macroinvertebrates inhabit.

COMMENT: ARCO generally commented, by reference to prior comments, that the State's assessment process is pervasively and fundamentally flawed.

RESPONSE: The State disagrees with this assertion as noted in prior and subsequent responses to comments raising specific objections to the assessment.

COMMENT: ARCO commented, more specifically with respect to the tasks described in Part III, that the State failed to consider the "wholly before 1980," "irreversible and irretrievable commitment" and "permitted release" statutory exclusions to natural resource damages liability under CERCLA.

RESPONSE: As noted previously in a response to a similar ARCO comment, the State disagrees that it failed to consider these

statutory exclusions to natural resource damage liability under CERCLA. These legal issues are for a court to resolve.

COMMENT: ARCO commented, more specifically with respect to the tasks described in Part III, that the State failed to adequately consider the effect of completed or anticipated response actions as required by CERCLA and the NRDA regulations.

RESPONSE: As noted previously in a response to a similar ARCO comment, the State believes that it correctly considered the effects of planned or anticipated response actions.

COMMENT: ARCO commented, more specifically with respect to the tasks described in Part III, that the State failed to define baseline in accordance with NRDA regulations, including establishing control or reference sites upstream of the release; and selecting streams significantly dissimilar to the Clark Fork River and Silver Bow Creek with respect to fish habitat variables and anthropogenic activities (i.e., sewage treatment plants, irrigation withdrawals, etc.).

RESPONSE: Due to the location of Butte, at the headwaters of the Clark Fork River Basin, selecting control areas upstream of the release is problematic. However, fish population sites on two tributaries (Flint Creek and Rock Creek) are technically upstream of reaches of the Clark Fork River affected by the release. The State's methodology for selecting control streams adequately characterizes baseline and complies with the applicable DOI regulations.

COMMENT: ARCO commented, more specifically with respect to the tasks described in Part III, that the State's approach with respect to reference streams is flawed by failure to comply with the NRDA regulations, and by making no allowance for the significant differences in both microhabitat and anthropogenic activities which exist between the Clark Fork River and reference

streams. In short, ARCO asserts the State has failed to properly determine the baseline from which injury can be quantified.

RESPONSE: As noted previously in a response to a similar ARCO comment, the State believes that it accurately characterized baseline. Specifically, the State isolated the effects of the releases of hazardous substances to determine and quantify injury and for restoration planning.

COMMENT: ARCO commented that the State used improper procedures and methodologies for determining and quantifying injury to aquatic resources, including the use of total metals rather than dissolved metals, as adjusted with a water effects ratio for determining injury to surface water, and the use of flawed field and laboratory studies.

RESPONSE: This comment does not directly relate to any task described in Part III. It is a more general critique of the State's aquatic resources assessment and repeats an earlier comment already responded to.

COMMENT: ARCO commented that the State failed to identify and quantify injury in terms of services provided by aquatic resources.

RESPONSE: This comment does not directly relate to any task described in Part III. It is a more general critique of the State's aquatic resources assessment and repeats an earlier comment already responded to.

COMMENT: ARCO commented that the State's approach to estimating fish populations in the Clark Fork River by snorkeling, rather than by electroshocking, would seriously underestimate fish populations in the Clark Fork River. ARCO asserts that snorkeling efficiency diminishes with stream size, and is especially difficult in channelized sections or where visibility is poor. Additionally, ARCO commented that the comparison of snorkeling and electrofishing methodologies described in Part III appears to be directed at defending snorkeling rather than determining which methodology is

most appropriate for accurately estimating fish populations. ARCO suggests snorkeling at night to account for diurnal behavior shifts that may occur, especially with cover-oriented species such as brown trout. ARCO recommends that the State use the mark-recapture (i.e. electrofishing) methodology.

RESPONSE: The State believes that its trout population estimates based on snorkeling are sound. The comparison between snorkeling and electrofishing was not intended to defend snorkeling. Rather, it was intended to assess whether the mark-recapture method results in higher population estimates than snorkeling. (Night snorkeling was not deemed practicable.)

COMMENT: ARCO commented that the State had not provided sufficient justification for its determination to proceed with its control area/reference stream approach in conducting the trout population surveys described in Part III. ARCO states that the State's reference stream approach does not conform to the DOI regulations pertaining to control area selection with respect to: location (upstream of Silver Bow Creek and the Clark Fork River); microhabitat differences; anthropogenic activities; and natural variability in the characteristics which were measured.

RESPONSE: In the Aquatic Report, the State thoroughly described the process by which reference streams were selected. Moreover, previous comments by ARCO have raised similar concerns and have been responded to above. The State believes that this process is the best available for identifying reference streams, and complies with the applicable DOI regulations.

COMMENT: ARCO identified many factors which it believes invalidates the State's method of selecting reference streams for trout population surveys, including the existence of wastewater treatment facilities; differences in physical and geomorphological characteristics; the density of tributaries used by trout for spawning; irrigation withdrawals and dewatering impacts; water temperature; effects related to channelization; naturally

occurring releases; and land use and other anthropogenic activities. ARCO suggests that the State cannot utilize its chosen reference streams to quantify compensable injury to trout within the Clark Fork River or Silver Bow Creek.

RESPONSE: See the response to the previous comment.

COMMENT: ARCO supported the State's water temperature data collection task. It suggested acquiring temperature data for Warm Springs Creek because it is an important tributary to the Clark Fork River and is subject to irrigation withdrawals and dewatering.

RESPONSE: Water temperature date was acquired for tributaries proximate to the fish population survey reaches used in the 1991 assessment work, because of the potential role of the tributaries as refuges for Clark Fork River fish. The furthest upstream Clark Fork River reach in the 1991 population work was located just upstream of Racetrack Creek. No reach was located near Warm Springs Creek. Consequently, temperature monitoring of Warm Springs Creek was not appropriate.

COMMENT: ARCO commented that the described dissolved oxygen monitoring was deficient because 1) no monitoring was proposed for Silver Bow Creek and the Clark Fork River; 2) the proposed effort was insufficient to document a chronic, recurring condition; 3) the timing and duration of dissolved oxygen excursions could not be determined; and 4) it would not allow for a valid comparison between dissolved oxygen excursions in the Clark Fork River, Silver Bow Creek, and reference streams. ARCO also stated that the described task would also not allow for the determination of dissolved oxygen impacts on the Clark Fork River and Silver Bow Creek.

RESPONSE: No monitoring was proposed for Silver Bow Creek or the Clark Fork River because the State decided to rely upon readily available existing data. The task was not intended to be an intensive monitoring effort to document the timing and duration of chronic, recurring conditions. Nor was it intended to determine

the impact of dissolved oxygen on the Clark Fork River and Silver Bow Creek. Rather, the task allowed for some very general comparisons of dissolved oxygen concentrations in reference streams and in the Clark Fork River, and comparisons to water quality standards.

COMMENT: ARCO commented that no objectives or standard methodologies were described for the analysis of trout gut contents and that without further specificity, ARCO could not comment meaningfully on this task. ARCO stated that the effort did not appear relevant to injury determination or quantification, and questioned why the Big Hole River was an appropriate reference stream for this work. ARCO further suggested that other data collection and analyses would be necessary for a meaningful study, including identification of the bioavailable fraction of metal in the gut; age, size and condition of fish; and characterization of gut contents.

RESPONSE: Analysis of hazardous substance concentrations in gut contents is relevant to injury quantification. Because the Big Hole River is not contaminated by hazardous substances, and is a reference stream for the fish population work, it is an appropriate reference for this task. The analysis of gut contents is intended to document the exposure of trout in the Clark Fork River to hazardous substances through food-chain pathways by direct analysis of gut contents. At the time Part III was written, it was not known whether standard methodologies existed for all of the work described in this task. However, Part III made it clear that analysis of gut contents would follow standard methodologies. Finally, identification of the bioavailable fraction of metal in the gut was not considered necessary for documenting exposure, but all the other suggested data would likely have been collected.

COMMENT: ARCO commented that no explanation was provided for analysis for dissolved organic carbon, preventing ARCO from commenting meaningfully. ARCO suggested expanding this effort to

include several additional tasks if the intent of the task was to evaluate the applicability and appropriateness of previous water effects ratio determinations.

RESPONSE: There is evidence that dissolved carbon ameliorates the toxicity of metals. The State's effort was not to evaluate the applicability and appropriateness of previous water effects ratio determinations. The objective of the task was to collect more dissolved organic carbon data than were readily available to better characterize dissolved carbon concentrations in the Clark Fork River. These data were potentially useful in interpreting metals toxicity in the Clark Fork River and effects on observed trout populations.

COMMENTS



ADM.ATIVE R.L. ID

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COMMENTS

OF ATLANTIC RICHFIELD COMPANY

ON THE STATE OF MONTANA'S OCTOBER 1991

"PREASSESSMENT SCREEN: CLARK FORK

RIVER BASIN NPL SITES, MONTANA"

NOVEMBER 25, 1991

SUBMITTED ON BEHALF OF
ATLANTIC RICHFIELD COMPANY

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Introduction

The State of Montana has issued a 48-page document entitled "Preassessment Screen: Clark Fork River Basin NPL Sites, Montana", dated October 1991, which purports to meet the requirements of the Department of the Interior regulations, 43 C.F.R. Part 11, §§ 11.23-11.25 for conducting a preassessment screen. In fact, the State's Preassessment Screen does not comply with those regulations and is fatally deficient in numerous legal and technical respects. Despite the obvious deficiencies in its Preassessment Screen, the State has also published a "Notice of Intent to Perform an Assessment," dated October 10, 1991. For the many reasons discussed in these comments, it is ARCO's position that the State's consideration of whether to perform an assessment must abide the issuance of an adequate preassessment screen in compliance with regulatory requirements.

The State's so-called Preassessment Screen is wholly inadequate and to launch an assessment now, without a comprehensive and reliably done, substantive preassessment screen, would violate the procedure mandated by the regulations, be contrary to the public policy embodied in the regulations, and cause the premature and irresponsible commitment of public funds and other resources to an ill-considered assessment. Indeed, the State's Preassessment Screen document is worse than inadequate, it is a transparent effort simply to incant the content and criteria of the regulations without meeting the substance of the requirements in order to be able to go to the next step in an assess-

ment. It is, in short, nothing less than a mockery of the regulatory scheme's requirement of a substantive threshold showing of natural resource injury claim.

The very purpose of the preassessment screen is to "ensure that there is a reasonable probability of making a successful claim before monies and efforts are expended in carrying out an assessment." 43 C.F.R. § 11.23(b). The preassessment screen is to consider and determine the sufficiency of each element of the State's claim for natural resource damages, see 43 C.F.R. § 11.23(e), and also to determine whether the damages claimed by the State are excluded from liability under CERCLA, see 43 C.F.R. § 11.24(b). The regulations require that the preassessment screen ". . . shall be conducted . . ." in accordance with 43 C.F.R. §§11.23, 11.24 and 11.25 and then the trustee shall determine whether all of the criteria of 43 C.F.R. §11.23(e) have been satisfied. Here, the State's Preassessment Screen begins with the unsupported assertion that each criterion has been met without any analysis or support of the expressly mandated considerations of §§11.23, 11.24 and 11.25. For example, most, if not all, of what the State complains about is the result of a century of the government of Montana's informed and knowing decisions and choices irreversibly and irretrievably to commit certain natural resources of the State, including those in and around the Clark Fork River Basin, to the mining of various minerals, including copper, and related smelting and other processing activity. Most, if not all, of the releases in ques-

tion occurred before the enactment of CERCLA in 1980. Any damages resulting from such a commitment or from such releases must be identified in a preassessment screen and may not be included in its analysis of the reasonable probability of a natural resource injury claim. However, instead, the State makes the untrue statement that it "is not aware of any damages which would be excluded from liability under CERCLA." Preassessment Screen ("P.S.") at 14. Thus, not only has the State failed to comply with a critical element of the preassessment screen analysis, but, also, it has not yet made the preliminary determinations on the substantive elements of its natural resource injury case that the regulations require. The State's failure and inability to produce an adequate preassessment screen plainly indicate that there is no reasonable probability that it can make out a successful natural resource damages claim against ARCO.¹

In sum, the State has failed to conduct its Preassessment Screen in accordance with the required procedures and analyses of 43 C.F.R. §§11.23, 11.24 and 11.25 and has not, and cannot, comply with the requirement that it "shall make a preliminary determination that all of the criteria [for the state's claim] are

¹ Indeed, the State has not reviewed even readily available information about the Clark Fork River Basin area as the regulations require. 43 C.F.R. § 11.23(b); 11.24(a). The Preassessment Screen actually identifies data in the hands of "the State and its contractors" and "the various state agencies" which the State has neither collected nor reviewed. See P.S. at 40. At the very least, the State must review that data as part of the preassessment screen process.

met before proceeding with an assessment." 43 C.F.R. § 11.23(e)(emphases added). Thus, the State may not proceed with an assessment of natural resource injury in the Clark Fork River Basin Superfund area. The following legal comments further detail the numerous fatal deficiencies in the State's Preassessment Screen.² The last section provides technical comments on the pervasive and material deficiencies of the "scientific" case presented in the Preassessment Screen and the State's improper use of and conclusions drawn from technical information and reports.

² These comments are not intended as an exhaustive list of the deficiencies in the Preassessment Screen but only to highlight the failure of the State to undertake and/or satisfy the essential elements of the preassessment screen process.

I. LEGAL COMMENTS

- A. State of Montana's Preassessment Screen Fails To Comply With the Requirements of the Regulations Regarding Natural Resource Damage Assessments, 43 C.F.R. §§ 11.23, 11.24, and 11.25
-

1. State Has Failed to Make Required Preliminary Determinations Regarding Release of Hazardous Substances, Including the Time, Quantity, Duration, and Frequency of the Release and Hazardous Nature of the Release
-

The State of Montana's Preassessment Screen simply does not make the preliminary determinations required concerning the occurrence of a release of a hazardous substance (43 C.F.R. § 11.23(e)(1)), the time, quantity, duration, and frequency of each discharge or release (43 C.F.R. § 11.24(a)(1)), or the circumstances of, environment of, weather conditions relating to and hazardous nature of the described release (43 C.F.R. § 11.25(a)(2)). There is absolutely no dispute that the cited regulations apply and must be followed in developing a preassessment screen; indeed, the State, throughout its Preassessment Screen, asserts that it has followed these regulations. It plainly has not.

The regulations concerning the determination that a release of a hazardous substance has occurred, the time, quantity, duration and frequency of the release in question, the circumstances of, environment of, weather conditions relating to and the properties of the alleged hazardous substance are neither peremptory nor do they permit discretion to the trustee. Rather, each is a requirement for a valid preassessment screen. Thus, Section 11.23(e)(1) of 43 C.F.R. provides that the trustee ". . . shall

make a preliminary determination that . . . (1) . . . a release of a hazardous substance has occurred; . . .". However, the Preassessment Screen, at p. 13, simply lists 13 hazardous substances which it says have been ". . . identified thus far as having been released . . ." from locations within the Clark Fork River Basin area but fails to state or describe any circumstances relating to the occurrence of the releases it asserts. Perhaps those substances are present, but that does not constitute or prove or show a release within the meaning of the statute and regulations. Moreover, the Preassessment Screen does not address the environment of any particular release or incident of releases or meteorological conditions, as is required.

Further, the regulations mandate, again using "shall," that the trustee determine the time, quantity, duration and frequency of the release or releases in question. 43 C.F.R. § 11.24(a)(1). Nowhere in the Preassessment Screen does the State make even a pass at attempting to satisfy this requirement. In Section 2.3 of the Preassessment Screen entitled "Time, Quantity, Duration and Frequency of Releases of Hazardous Substances", the State simply summarizes the current status, geographic location, mining-related history and alleged current condition of four locations within the Clark Fork River Basin area, without any detail as to time, quantity, duration or frequency of any release of any hazardous substance. For example, in connection with the Milltown Reservoir location, the Preassessment Screen says only--

Significant levels of arsenic, lead, zinc, cadmium, and other hazardous substances have been found in the approximately six million cubic yards (4.6 million m³) of sediments that have accumulated behind the dam (U.S. EPA and MDHES 1900).

-- and then continues with the useless generalization --

Multiple, and at times continuous, releases of hazardous substances to both surface and groundwaters have occurred repeatedly through river action, resuspension and transport of sediments, and exchange with the groundwater aquifer.

Similar summary and general statements are made as to each of the other three locations within the facility. Plainly, they do not satisfy the required specifics of the alleged releases.

Finally, the State makes the general and unsupported assumption that mine waste materials are "hazardous substances" and that the State may recover for damage to natural resources allegedly caused by release of such wastes. The State has failed to examine this issue in light of the applicable law, and therefore it has failed to make the required preliminary determination under 43 C.F.R. § 11.23(e)(1) that a "release of a hazardous substance has occurred." (Emphasis added.)

Mine wastes "from the extraction, beneficiation and processing of ores and minerals" are not hazardous substances under CERCLA. CERCLA § 101(14), 42 U.S.C. § 9601(14), which defines hazardous substances, specifically exempts "any-waste, the regulation of which under the Solid Waste Disposal Act has been suspended by Act of Congress." Regulation of "[s]olid waste from the extraction, beneficiation and process of ores

and minerals, . . ." had been suspended by Act of Congress in § 3001(b)(3)(A) (ii), 42 U.S.C. § 6921(b)(3)(A)(ii), of the Solid Waste Disposal Act, prior to the enactment of CERCLA. Therefore, the State cannot recover for the injury it claims as a result of the release of mine waste substances, because they are not "hazardous" by the statutory definition. This issue certainly should have been disclosed in the Preassessment Screen and, alone, must bar the State from proceeding to an assessment. The State's failure even to acknowledge the issue reveals the "sham" nature of its Preassessment Screen.

2. State Has Failed to Make Required Preliminary Determination and Identification of the Natural Resources Of Which It Is Trustee and Which Have Been or Are Likely to Have Been Adversely Affected By Releases

The State of Montana's Preassessment Screen does not make the required determination that any natural resource for which the State may assert trusteeship under CERCLA has been or is likely to have been adversely affected by release of a hazardous substance, nor does the Preassessment Screen identify, as is also required, any natural resource for which the State is trustee which is potentially affected by the alleged release of a hazardous substance. See 43 C.F.R. §§ 11.23(e)(2) and 11.25(e)(1) and (2).

Throughout section 3.0 of the Preassessment Screen entitled "Preliminary Identification of Resources at Risk," the State purports to address pathways by which natural resources might be affected, describes only very generally and completely inadequate-

ly surface waters, groundwaters, sediments, riparian vegetation, certain biological samples, and, then, in section 3.4 entitled "Potentially Affected Resources" and another, Section 3.5 entitled "Preliminary Estimate of Affected Services", the State simply lists ten categories of natural resources with no effort at specific identification except as to only three. As to the three, the State has, under "surface water," included the Clark Fork River, Silver Bow Creek, Warm Springs Creek, Mill Creek, Willow Creek, and Warm Springs Ponds; under "groundwater", the State has included ". . . aquifers underlying Butte, Anaconda and Milltown"; under "riparian wetlands", the State has included Warm Springs Ponds. The State has only generically described services of those resources affected or potentially affected. For example, the State lists water for ". . . drinking and other domestic uses," and ". . . for irrigation of crops and livestock," ". . . contact recreation, including swimming, boating and other activities," and ". . . air for breathing, visibility and aesthetics."

These completely general, if not generic, descriptions of resources and related services simply do not satisfy the requirements of 43 C.F.R. §§ 11.23(e) and 11.25(e)(1) and (2). As has been noted, the point of the Preassessment Screen review is to determine whether there is a sufficient basis to go on to the assessment of injury and quantification of damages process. Thus, in order to meet the requirements of the regulations as they fulfill the purpose of the Preassessment Screen, the State must spe-

cifically determine and identify the natural resources and related services which have been or might have been injured by the release of a hazardous substance and the resources and services must be tied to or identified with a particular release, (which itself must be sufficiently identified in terms of time, duration, quantity, impact and other circumstances (see Section 1, supra)), so that it may determine whether the release or releases in question occurred prior to the enactment date of CERCLA (December 11, 1980), occurred as part of an irreversible and irretrievable commitment of resources and/or constitute a permitted release; injury to any resource or service affected or potentially affected by any release falling into one or more of those categories is not actionable under CERCLA, and, thus, under the regulations, must be identified and excluded in the preassessment screen analysis. No such link is even attempted in the State's Preassessment Screen.

Moreover, under the regulations, in the preassessment screen, the State must make a preliminary determination that:

[n]atural resources for which the federal or state agency may assert trusteeship under CERCLA have been or are likely to have been adversely affected by the discharge or release.

§ 11.23(e)(2). The State has not complied with this requirement by failing to identify the natural resources and their geographical locations for which the State claims a trustee relationship. Without such identification, the State cannot maintain its ac-

tion for damage to those natural resources, and, therefore, it cannot justify proceeding with an assessment.

By way of example, Article X § 11 of the Montana Constitution (1972) defines public land as: "All lands of the State that have been or may be granted by congress, or acquired by gift or grant or devise from any person or corporation . . .". The constitutional provision also states that those lands will be held in trust for the people of the State of Montana. Thus, that constitutional provision defines those public lands held in trust by the State of Montana for which the State may claim a trustee relationship. Because of the clear limitations on the State's trusteeship, ARCO believes that there may be a jurisdictional conflict between agencies of the United States and the State of Montana with respect to some natural resources. The State's failure to recognize these limitations is compounded by CERCLA § 107(f)(1), 42 U.S.C. § 9607(f)(1), which provides that there "shall be no double recovery . . . for natural resource damages, including the cost of damage assessment or restoration, rehabilitation, or acquisition for the same release and natural resource." (See 43 C.F.R. §§ 11.15(a)(1)(iii) and (d)). Therefore, to the extent the State claims damages for injuries to natural resources which belong to, are managed by, held in trust by, pertain to, or are otherwise controlled by a private person or another trustee, the State will be precluded from recovering damages and/or assessment costs which would result in double recovery, or for which another trustee has a trust relationship.

Indeed, under 43 C.F.R. § 11.20(c), the State must identify other natural resource trustees. For example, in Section 3.2.1 of the Preassessment Screen, the State seems to be asserting a claim relating to and, thus, presumably trusteeship over certain privately owned depositional areas. The State has no jurisdiction or authority as a trustee over those areas. This is but an example of the kind of loose, undisciplined and misleading presentation which pervades the Preassessment Screen.

3. State Has Failed to Make Required Preliminary Determination As to Causation of Injury, and Failed to Obtain and Review Information Regarding Potentially Responsible Parties

In its Preassessment Screen, the State failed to make -- or even obtain information sufficient to support -- a preliminary determination regarding causation of injury to natural resources, as required by 43 C.F.R. § 11.23(e):

[T]he authorized official shall make a preliminary determination that all the following criteria are met before proceeding with an assessment:

* * *

(3) The quantity and concentration of the discharged oil or released hazardous substance is sufficient to potentially cause injury, as that term is used in this part, to those natural resources . . .

(Emphasis added.)

While the State has included in the Preassessment Screen some site-specific information as to elevated concentrations of certain allegedly hazardous substances, the State offers no information which would support a determination that those concen-

trations have actually caused or may cause any injury to specifically identified natural resources in the Clark Fork River Basin area. Furthermore, the State is completely silent on the issue of cleanup efforts which may remedy the problems of elevated concentrations. See infra section 5.

Additionally, the State has made no effort to establish the critical causation link between any potentially responsible parties, including ARCO, and any claimed injury to natural resources. Without any information on this point, the State cannot make the required preliminary determination of causation under § 11.23(e).

Nor does the State comply with the closely related dictates of § 11.24(a)(3), and (6):

The authorized official shall obtain and review readily available information concerning:

* * *

(3) The history of the current and past use of the site identified as the source of the discharge of oil or release of a hazardous substance;

* * *

(6) Potentially responsible parties.

The State devotes only one page to the 100-year history of mining in the Clark Fork Basin, and that meager effort contains errors and significant omissions. The State's description is historically inaccurate in several respects, including an incorrect attribution to Lewis and Clark and errors as to the relevant dates of mining developments, the number of smelters in op-

eration and their capacity. For example, while the State claims that "by 1899 Butte . . . contained 42 working smelters," (P.S. at 3), the State's cited source indicates that there were only five. See Freeman, A Brief History of Butte, Montana, at 64.

More important, however, are the omissions in the Preassessment Screen. The State glosses over the issue of potentially responsible parties. It does not identify one owner, operator, arranger, or transporter -- the categories of possibly liable parties -- who may bear responsibility other than ARCO. The State simply notes that, in 1976, ARCO purchased Anaconda Copper Mining Company, which the State claims had "gained control over most of the [unidentified] operations in the Butte area." P.S. at 3. Aside from these passing notes, the State gives no consideration to potentially responsible parties, announcing baldly its identification of ARCO as the "primary" PRP, (P.S. at 14), although no other "primary" or "secondary" PRPs are named. For example, there are current mining operations conducted by MRI and Asarco which may be releasing hazardous substances into the environment on a current and ongoing basis; at the Montana Pole site,, Miners Bank and the Montana Pole and Treating Plant were owners and operators of that facility; and, the United States, Burlington Northern, the State of Montana itself and others also had operations in the Clark Fork River Basin.

In short, the State does not begin to comply with the requirement that it obtain and review information regarding the

sources of particular releases and the parties who may be potentially liable therefore as owners or operators or on some other statutory basis. Without such information and review, the Preassessment Screen is critically deficient and any assessment would be premature.

4. State Has Failed To Make Required Preliminary Determination As To Injury Or Potential Injury To Natural Resources

a. The Standard

Before proceeding with an assessment, the trustee must demonstrate that "[t]he quantity and concentration of the . . . released hazardous substance is sufficient to potentially cause injury, as that term is used in this part, to those natural resources." 43 C.F.R. § 11.23(e)(3). The trustee's failure to demonstrate injury is fatal. The Department of the Interior's comments on this subject are unequivocal:

To assert a natural resource damage claim, the authorized official must establish that an injury occurred and must link that injury to the discharge or release. Otherwise, no further assessment actions are to be taken and no assessment costs will be recovered.

51 Fed. Reg. 27679.

Thus, the trustee has the burden of establishing that an injury to natural resources has occurred. If the trustee is unable to demonstrate injury, the inquiry must end, and the natural resource damage claim fails. Thus, a Preassessment Screen must establish this critical causation link.

b. The Preassessment Screen Fails to Demonstrate Injury to Any Natural Resources

As directed by the regulation, in making its injury determination, the trustee must look to the definition of injury as that term is used in the regulations. The regulations require the trustee "to determine that an injury has occurred to natural resources based upon the definitions provided in this section. . . ." 43 C.F.R. § 11.62. The regulations enumerate the conditions that the trustee must show with respect to specific resources in order to determine that those resources have been injured. The regulations provide definitions for surface water, ground water, air, biological and geologic resources. The State has failed adequately to demonstrate that any of these resources have been injured.

i. Surface Water Resources

Under the regulations, in order to establish that there has been an injury to surface waters, the trustee must establish, among other things, that the concentrations and duration of substances in those waters exceed the levels enumerated in specific sections of the Solid Waste Disposal Act and the Clean Water Act. 43 C.F.R. § 11.62(b)(1). The regulation recognizes that detailed information is necessary to assess adequately whether an injury has, in fact, occurred.

The Preassessment Screen fails to identify any specific water quality standard, let alone demonstrate that the concentrations of the hazardous substances have exceeded the specified levels for the appropriate duration. (P.S. at 34-35). Instead,

it presents a hodgepodge of "evidence" that heavy metals are present in the Clark Fork Basin. (P.S. at 34-35). The Preassessment Screen merely notes that concentrations of hazardous substances "often exceed the U.S. EPA standards." This vague reference to EPA standards is insufficient to establish injury. The Preassessment Screen provides no information regarding the extent of surface water contamination. Moreover, the Preassessment Screen is silent as to the duration that the hazardous substances have been present in surface water or how long these substances are likely to persist. (P.S. at 34) The Preassessment Screen attempts to gloss over the duration requirement by stating that "[t]he evidence of heavy metals . . . has been documented numerous times over the past twenty years." (P.S. at 34).

The regulations also require that certain sampling procedures must be followed in order to establish injury. 43 C.F.R. § 11.62(b)(2). Again, the trustee has completely failed to state whether these standards have been followed, let alone whether they demonstrate that an injury has occurred. (P.S. at 34-35).

ii. Ground Water Resources

The regulatory requirements that must be met to show ground water injury are similar to those necessary to show surface water injury. In particular, the trustee must show that the concentrations of substances in the ground water resources exceed the water quality criteria established by enumerated sections of the Solid Waste Disposal Act and the Clean Water Act. 43 C.F.R.

§ 11.62(c). In addition, the trustee must follow certain prescribed sampling procedures to establish injury.

As with surface water, the Preassessment Screen fails to identify the water quality criteria against which samples were compared. (P.S. at 35-36). The Preassessment Screen fails to provide any meaningful information upon which an evaluation of injury can be made. It does not identify which aquifers have been impacted, the magnitude or extent of the impact, or the duration or persistence of the contamination. Without this information a meaningful evaluation of injury cannot be made.

Moreover, the Preassessment Screen does not describe whether the appropriate sampling procedures were followed. (P.S. at 35-36). Based on the scant description provided in the Preassessment Screen, it appears that these procedures were not followed. For example, the Preassessment Screen merely states that "[s]ix of the domestic wells exceeded secondary drinking water standards for arsenic, cadmium, iron, and/or zinc . . ." (P.S. at 35). There is no mention of how many wells were sampled, where the wells were located, how many times the wells were sampled or what other activities contributed or may have contributed to the contents of the wells. Moreover, many of the samples relied upon by the State were taken prior to the effective date of the regulations, making it unlikely that these procedures were followed. (P.S. at 35-36).

iii. Biological Resources

In order for there to be injury to biological resources, the regulations require that the concentration of the substance be sufficient to undergo an adverse change in viability (such as abnormalities, disease, or death), to exceed action or tolerance levels in edible portions of organisms, or to exceed levels for which an appropriate health agency has issued directives to limit or ban consumption of such organisms. 43 C.F.R. § 11.62(f)(1).

The Preassessment Screen does not adequately address any of these criteria. It merely notes that the levels of substances found in the Upper Clark Fork River have been shown to be toxic to many species of fish. (P.S. at 36). There is no mention as to whether such impacts have actually been found in the assessment area. Moreover, the Preassessment Screen makes no attempt to evaluate the extent, duration, magnitude or frequency of such impacts. Nor does it attempt to determine whether such impacts were actually caused by a release for which ARCO is responsible. The Preassessment Screen merely refers to isolated fish kills. (P.S. at 36). Reference to a handful of episodic events of unknown cause such as isolated fish kills hardly demonstrates that the concentration of substances in the water is responsible for a continuing injury to this resource.

The Preassessment Screen's attempt to demonstrate injury to wildlife is even more feeble. The trustee cites no site-specific injury to any bird or mammal. (P.S. at 37). Rather, the

Preassessment Screen merely states that "[t]he uptake of heavy metals by birds and mammals can cause impairment or destruction of biological functions . . ." (P.S. at 37)(emphasis added).

As with ground water and surface water, the regulations prescribe certain sampling procedures. 43 C.F.R. § 11.62(f)(2). Once again, the Preassessment Screen is silent as to whether these procedures were followed.

iv. Geologic Resources

The regulations enumerate a number of measures against which the trustee may establish that an injury to geologic resources has occurred. 43 C.F.R. § 11.62(e). Nevertheless, the Preassessment Screen once again fails to identify any site-specific evidence that there has been an injury to this resource as defined by the regulations. (P.S. at 37, 40).

The Preassessment Screen merely cites a few studies that suggest that certain substances may cause an impact on vegetation. (P.S. at 37, 40). The Preassessment Screen then attempts a sleight of hand by stating that "[e]xamples of potential injuries caused by releases of hazardous substances in the Clark Fork Basin include the State-owned Mt. Haggin Game Management Area and surrounding lands . . ." (P.S. at 40). The Preassessment Screen, however, fails to state whether any injuries to these areas have in fact occurred, or where they have occurred. Importantly, the State did not even acquire title to Mount Haggin until 1976 and the purchase price reflected the then current condition of the property.

The State concludes that "upland vegetation has potentially been injured." (P.S. at 40). The only support the State can muster to demonstrate this potential injury is a study performed in 1972 prior to CERCLA's enactment. (P.S. at 40). The Preassessment Screen fails to describe what vegetation or other geologic resource has been injured. It makes absolutely no attempt to evaluate the extent of any injury, the duration of that injury or the impact of that injury on services provided by the resource.

Simply put, the State has failed to meet the regulations' definition of injury with respect to any resource. Consequently, the State has failed to justify any further action with respect to those resources.

c. The Preassessment Screen Fails To Demonstrate That There Is A Reasonable Probability Of Making A Successful Claim

The Preassessment Screen must demonstrate that "there is a reasonable probability of making a successful claim before monies and efforts are expended in carrying out an assessment." 43 C.F.R. § 11.23(b). In order for the trustee to reach this conclusion, the trustee must determine the extent of the injury. This includes determining how much of the resource has been injured, how "badly" it has been injured and the effect the injury has had on services provided by the resource. 51 Fed. Reg. 27686. The Preassessment Screen makes no attempt to address any of these issues.

To determine how much of a resource has been injured and how 'badly' it has been injured, the trustee must compare the conditions at the site with "baseline conditions." Baseline conditions are "the conditions that would have existed at the assessment area had the. . . release of hazardous substance under investigation not occurred." 43 C.F.R. § 11.14(e). Baseline conditions include physical, chemical, and biological conditions as well as services. 43 C.F.R. § 11.72(a). The Department views the concept of baseline as "a way to distinguish between effects resulting from actions of the responsible party and effects resulting from other causes."¹ 51 Fed. Reg. 27716.

The Preassessment Screen makes absolutely no attempt to evaluate the baseline. In determining baseline, the regulations require the trustee to examine historical data or to compare the area to "control areas." 43 C.F.R. § 11.72(c)-(d). The

¹The comments elaborate on this concept:

Baseline is not intended to represent necessarily pristine conditions, nor is it intended to represent conditions in the absence of 'any' discharge or release. Rather, the rule specifically requires that baseline represent conditions that would have existed in the absence of the specific discharge or release under investigation. Thus, effects of other discharges or releases, as well as any other natural or human-caused effects, are to be accounted for in determining the baseline against which the effects of the discharge or release under investigation are measured. The intent is to restrict liability to those effects resulting from the responsible party's actions, as in any other liability situation.

Preassessment Screen discusses historical data in a patently superficial and inaccurate manner, but, even so, it is not apparent that this data is being used to establish a baseline. While historical data are preferred, the trustee must use control areas when the historical data available do not meet the regulation's requirements for such information. *Id.*

In either case, the regulations require baseline data to "reflect conditions that would have been expected at the assessment area had the . . . release . . . not occurred, taking into account both natural processes and those that are the result of human activities." 43 C.F.R. § 11.72(b)(1). The data presented in the Preassessment Screen are wholly inadequate to form any basis for a baseline. The State has failed to take into account either natural processes or human activities in the Preassessment Screen. The Preassessment Screen simply leaps from the 1800s to the present without taking into account the many changes that have taken place in the area. For example, the State fails to take into account any naturally occurring phenomena including the massive flood of 1908 in which flooded tailing ponds broke dams. Surely, this event must be considered in any evaluation of baseline conditions. Moreover, the State has failed to consider the effects numerous human activities other than hardrock mining may have had on conditions in the assessment area. For example, there are other industries in the area, including tanneries, that may affect the baseline. Inasmuch as

the site is located in and around a mining district, such an analysis is essential.²

The Department of the Interior's comments on the baseline regulations recognize that a mining district is an area of particular concern:

[I]n a mining district where there may be a 'background' level of a particular hazardous substance in all water collected, if it is clear that the release under investigation is not responsible for that background level, that background level would likely be an appropriate baseline level.

51 Fed. Reg. 27716. Yet the Preassessment Screen makes no attempt to separate these factors. In fact, the Preassessment Screen does not even define the release to which the baseline must be compared. Without this information, the State is unable to conclude that there is a reasonable probability that a successful claim can be made.

In a mining district like the Butte-Anaconda region of Montana, baseline must take into consideration that level of contaminants normally associated with the mining of the particular minerals involved. Mining operations necessarily involve the production of substances including the mineral mined and other byproducts. Just as a company in an urban area must be measured against the level of hazardous substances that one would expect

² There are numerous impacts which must be accounted for in establishing baseline, e.g., road building, sewage discharges, irrigation and other activities related to cattle grazing and farming and other industrial activities and urban impacts.

in such an area, so should a company in an area that will necessarily be put to mining use be measured against the background level of substances that such activities produce. Once resources have been committed to a particular use, the baseline should reflect any side effects associated with the development of that use. Only releases not associated with the natural development and use of those resources should be considered when determining whether a resource has been injured and by how much.

The regulations further require that the baseline data should "include the normal range of physical, chemical, or biological conditions for the assessment area or injured resource . . . with statistical descriptions of that variability . . .," 43 C.F.R. § 11.72(b)(2), and should "be as accurate, precise, complete, and representative of the resource as the data used or obtained in § 11.71" 43 C.F.R. § 11.72(b)(3). Moreover, the data used for "both the baseline and services reduction determinations must be collected by comparable methods." Id.

The Preassessment Screen does not even come close to meeting these exacting standards. It merely refers to historical anecdotes indicating, for example, how pristine and clean the area was when Lewis and Clark first explored the area. It makes no attempt to provide any technical or scientific analysis of baseline conditions as contemplated by the regulations. To be effective, a preassessment screen must provide, for each resource and its related uses, a detailed definition of those resources and uses. Further, it must perform an analysis of whether those re-

sources and uses would otherwise be available and the impact of other phenomena on them. The State of Montana's Preassessment Screen does none of those things.

5. State Has Failed to Make Required Preliminary Estimate of Services of Potentially Affected Natural Resources

The Preassessment Screen also makes no attempt to determine the effect of the alleged injury on services. The Preassessment Screen merely lists generic services that may be impacted. For example, the Preassessment Screen lists "[c]onsumptive and non-consumptive outdoor recreation, including fishing, hunting, trapping, and wildlife viewing and photography," (P.S. at 32), as some of the services "provided or potentially provided by," (P.S. at 32), its similarly generic list of potentially affected resources. The Preassessment Screen makes no attempt to determine which specific services have been impacted, the baseline of those services, the extent of injury to those services and whether PRPs have provided offsetting services.³ Without this critical information, the State is totally incapable of concluding that there is any probability that a successful claim may be made. Consequently, the State is not justified in expending monies and effort to carry out an assessment.

³ One example of offsetting services which the State has failed to take into account is Georgetown Lake, a vast potpourri of natural resource amenities providing a wealth of services. Georgetown Lake and access to Georgetown Lake were created by ARCO's predecessors in interest, and they represent the replacement of natural resources and services which the State claims have been injured.

6. State Has Failed to Make Required Preliminary Determinations As to Current Response Actions Or the Inability of those Response Actions To Remedy the Claimed (But Unidentified)

The State makes no attempt to satisfy the requirement of 43 C.F.R. § 11.23(e)(5), which calls for a preliminary determination that:

Response actions, if any, carried out or planned do not or will not sufficiently remedy the injury to natural resources without further action.

The State does not even identify a single response action carried out or planned, let alone determine that response actions will not sufficiently remedy the claimed (but unidentified) injury. Once again, the State has not complied with the regulations, and therefore it cannot proceed with an assessment.

The State's short paragraph on the entire subject of response actions is five lines on the last page of the Preassessment Screen. Although it alludes to response actions having been implemented in the Clark Fork Basin, it does not describe any of them. It does not explain what injuries are being remedied by those response actions, nor does it attempt to state what injuries, if any, will remain after all response actions have been carried out. It simply opines, without any foundation, support, or analysis, that "it is unlikely that the natural resources of the Basin will be restored for centuries to come, if at all." There is not a shred of scientific evidence in the Preassessment Screen to support such a statement. It is

an irresponsible, unfounded basis on which to begin any assessment, and it does not satisfy the specific requirements of the regulation, § 11.23(e)(5).

7. State Has Failed to Make Required Preliminary Determination as to Actual Cost and Reasonableness of the Cost of Obtaining Sufficient Data to Pursue an Assessment

The regulations also require that, in the Preassessment Screen, the State make a preliminary determination that "[d]ata sufficient to pursue an assessment are readily available or likely to be obtained at reasonable cost." 43 C.F.R. § 11.23(e)(4). Here, where the State has failed to identify with sufficient particularity the releases, the natural resources and services affected or the injury it claims, it cannot possess the required information as to the costs of obtaining data to assess what has not yet been identified.

In its Preassessment Screen, (P.S. at 40-41), the State claims that "significant amounts of data relevant to conducting an assessment" exist in various locations, including "the State and its contractors" and "the various state agencies." P.S. at 40. If this is true, surely the State is obliged to include such readily obtainable data in the Preassessment Screen. See 43 C.F.R. § 11.24(a); 11.23(b). If such data are not readily obtainable, then the reasons therefore should be stated, including the costs of obtaining the data. Simply alluding to the existence of apparently readily obtainable data, without actually obtaining or at least estimating the cost of obtaining them, is exactly what compliance with the regulation is designed to avoid.

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As to the cost of obtaining additional data, the State, in a remarkable piece of circular reasoning, states that "the cost of collecting additional data for purposes of performing a damage assessment is expected to be substantially less than the anticipated damage amount determined in the assessment." For the State to defer judgment of the reasonableness of the cost of the assessment until the conclusion of the assessment is absurd and impermissible under the regulations. Where the subject of the assessment is inadequately identified, the need for data sufficient to pursue the assessment cannot be estimated. Thus, the State cannot arrive at the required preliminary determination that the unknown supporting data can be obtained at reasonable cost.

8. State Has Failed to Make Required Determinations As to Damages Specifically Excluded from Liability Under CERCLA

In the Preassessment Screen, the State has ignored its duty under 43 C.F.R. § 11.24(b)(1) to determine specific exclusions from liability under CERCLA. Under § 11.24(b)(1), "[t]he authorized official shall determine whether the damages" fall under one of four categories of injury specifically excluded from liability under CERCLA. 43 C.F.R. § 11.24(b)(1) (emphasis added). In the Preassessment Screen, after noting "[t]he State of Montana is not aware of any damages which would be excluded from liability under CERCLA," (P.S. at 14, emphasis added), the State then parrots the four categories listed in the regulation, bald-

ly asserting without any foundation or reason that none of the four applies.

Even to those not familiar with the State's natural resource damage claim, the State's assertion is patently untrue and, indeed, absurd, in light of the history and duration of copper mining activities and related operations in the Clark Fork River Basin area and the knowing, intentional and affirmative acts of the government of Montana to advance, support and facilitate those activities and operations.

Moreover, the regulation does not permit the State to fill in the blanks based on what it may or may not be "aware of." The regulation requires the State to make an affirmative determination as to the existence of statutory exceptions to liability. The regulation further enjoins the State from making an assessment of any excluded damages:

An assessment under this part shall not be continued for potential injuries meeting one or more of the criteria described in paragraph (b)(1) of this section, which are exceptions to liability provided in sections 107(f), (i), and (j) of CERCLA.

43 C.F.R. § 11.24(b)(2) (emphasis added).

The State's failure to comply with the regulations in this respect is fatal, for the claimed injuries do indeed meet the criteria as exceptions to liability. Thus, the State's proposed assessment cannot legally go forward.

For example, the State's claim for damages based on releases of hazardous substances from historic copper-mining and re-

lated ore-processing activities is barred because any claimed damages

[r]esulting from the discharge or release were specifically identified as an irreversible and irretrievable commitment of natural resources in an environmental impact statement or other comparable environmental analysis, that the decision to grant the permit or license authorizes such commitment of natural resources, and that the facility or project was otherwise operating within the terms of its permit or license.

43 C.F.R. § 11.24(b)(1)(i). See also CERCLA, 42 U.S.C. § 9607(f)(1).

This exception for damages to committed resources will prove fatal to virtually any recovery on the State's claim for natural resource damages. It is plain from the State's Preassessment Screen itself, as well as from readily obtainable materials, that historic mining and smelting activities in Montana involved irreversible and irretrievable commitments or, stated differently, intentional tradeoffs of certain natural resources. For instance, historic tailings and waste disposal practices of the mining and related industries in the Butte and Anaconda areas were well-known and in fact authorized and encouraged by Montana officials in exchange for economic benefits. Nowhere in the Preassessment Screen does the State address this basic point. Yet, evidence of these facts is readily obtainable from publicly available sources, including state statutes relating to the delegation of the State's power of eminent domain, reports to the governor by the Montana fish and game warden, state of the state addresses from the governor to the legislature, and

state legislative action and inaction regarding mining and other waste disposal practices. The State of Montana knowingly made the irreversible and irretrievable commitment of natural resources as a clear trade-off for the benefits of the mining business. The benefits, about which the State's Preassessment Screen is entirely silent, were described in 1910 by the Montana Supreme Court in these terms:

Mining is a dominant industry in this state. In some localities it is the all-important industry. The prosperity of the state has been due, in large measure, to it, and many of our other industries and business enterprises are almost entirely dependent upon it. This is especially true in Butte and its immediate vicinity, because there the great mass of the people gain their livelihood from their employment in the mines and reduction of ores. There, as in many other localities in the state, the mineral deposits are the only available natural resources, and but for the promise which they give a profitable return for well-directed investment and industry, such portions of our state would be almost entirely destitute of population, whereas they now furnish homes and the means of support for populous communities. Hence, from the beginning, it has been the policy of the State, indicated by its constitutional and statute law, as interpreted by this Court, to foster and encourage the development of the State's resources in every reasonable way. It has favored the industry of mining in the matter of taxation of mining property, and has included among the public purposes for which private property may be taken by the exercise of the right of eminent domain, roads, tunnels, ditches, flumes, pipes, and dumping places for working mines, mills, or smelters so that reduction of ores, etc.

Kipp v. Davis-Daly Copper Co., 41 Mont. 509, 518, 110 P. 237 (1910). Because of the State's commitment of natural resources

as a trade-off for the significant benefits of mining and related activities, the State cannot now recover damages from a private party for any loss of those resources.

Furthermore, the State has failed to make the required determination under 43 C.F.R. § 11.24(b)(1)(iv) as to the exception to liability for permitted releases. The State has failed to take into account National Pollution Discharge Elimination System permits, Montana Pollution Discharge Elimination System permits, permits to construct and operate sources of emissions to the air issued under the Clean Air Act, 42 U.S.C. § 7401 et seq., and the Montana Clean Air Act, Mont. Code Ann. § 75-2-101 et seq., and other federal and equivalent State program authorizations described in the definition of federally permitted release at Section 101(10) of CERCLA, 42 U.S.C. § 9601(10) and relevant case law thereunder.

In addition, the State's recovery is barred where the damages that the State now complains of were the result of releases which "occurred wholly before enactment of CERCLA." 43 C.F.R. § 11.24(b)(1)(ii); CERCLA 42 U.S.C. § 9607(f)(1). As the historical and scientific references in the Preassessment Screen graphically illustrate, virtually all of the releases described and any injury which "may" have been caused occurred well before the enactment of CERCLA and are, thus, exempt from liability.

The Department of the Interior regulations which govern the development of a Preassessment Screen and which the State of Montana expressly states that it followed in preparing its

Preassessment Screen for the Clark Fork River Basin Superfund area provide --

The authorized official shall determine whether . . .

* * *

(ii) . . . The release of a hazardous substance from which such damages resulted have occurred wholly before enactment of CERCLA; . . .

* * *

43 C.F.R. § 11.24(b)(1).

The regulations then state that an assessment under the regulations ". . . shall not be continued for potential injuries meeting one or more of the criteria described . . . which are exceptions to liability provided in sections 107(f) . . . of CERCLA". 43 C.F.R. § 11.24(b)(2).⁴

Thus, the applicable regulations which the State says it is following mandate that the trustee assume the burden of determining whether the releases of the hazardous substance or substances in question occurred before December 11, 1980. In order to fulfill that assignment and carry its burden of demonstrating that there are no such releases, the State would have to engage in a detailed and specific exercise similar to that required to meet other aspects of the preassessment screen regu-

⁴ As the regulations expressly note, CERCLA § 107(f)(1) expressly bars recovery for natural resource damages ". . . where such damages and the release of a hazardous substance from which such damages resulted have occurred wholly before December 11, 1980."

lations to identify each release or incident of releases in question sufficiently to ascertain when they occurred and when they ceased to occur and what, if any, injury each particular release or incident of releases caused. Any release of a hazardous substance which occurred before December 11, 1980 may not be the subject of an assessment (§ 11.24(b)(2)) and, thus, may not be included in the preassessment screen analysis. Contrary to the regulations, the State's Preassessment Screen is virtually entirely predicated upon pre-enactment releases.

Even the summary and, as it turns out, materially inaccurate description of the activities in question appearing in the Preassessment Screen makes plain that the majority of mining and related smelting activities had stopped by or in 1980 before December 11 and that only a few, discrete mining and processing operations continued thereafter. Pursuant to 43 C.F.R. § 11.24(b), the burden is on the State to determine which releases out of the millions which may have occurred from 1860 to December 10, 1983 (when the State commenced its natural resources damages action against ARCO) occurred on or after December 11, 1980. However, the State makes not even a passing effort at this required determination and, without any discussion of the issue or even acknowledgement that, in other parts of the Preassessment Screen it discusses historical releases, concludes that "[t]he damages and the release of a hazardous substance from which such damages resulted have [not] occurred wholly before enactment of CERCLA . . ." P.S. at 14. This bla-

tant avoidance of perhaps the most obvious and compelling legal issue relating to natural resource damages liability for the Clark Fork River Basin area is not only absurd and unacceptable but also outrageous in view of the historical information and resources available to the State and its statements at section 4.4 of the Preassessment Screen concerning the availability of historical and scientific data.

In view of this obvious and wholly unacceptable abdication of its burden to screen out releases of hazardous substances which occurred before the enactment of CERCLA on December 11, 1980, the State's Preassessment Screen should be rejected, and the State should be required to go back to the drawing board, or more specifically to the data it recognizes exist, to do a Preassessment Screen which comports in all respects with the applicable regulations.

In sum, the State has failed to undertake the essential elements of the Preassessment Screen process. Instead, by aggregating cumulative assessments of elevated concentrations of certain substances, the State attempts to bootstrap over the specific requirements of the regulations. It must be understood, however, prior to the initiation of an assessment, as the regulations and statute make clear, that, even assuming the State establishes the essential elements of release, causation, injury, and damages, the State may only recover damages for injury to natural resources where the release and injury occurred after December 11, 1980, the damages are not subject to the exclu-

sion for permitted releases and irreversible and irretrievable commitment of natural resources, and, at all events, the total amount of damages recoverable are limited to \$50 million by statute. Simply cataloguing concentration levels of waste substances does not meet the regulatory requirements of a Preassessment Screen.

II. TECHNICAL COMMENTS

The comments in this section address the technical aspects of the State's Preassessment Screen. A technical review of the document demonstrates that the Preassessment Screen is seriously flawed by the State's improper and reaching use of and conclusions drawn from a small and, in some cases, misleading selection of technical information and reports. In sum, in the Preassessment Screen the State has used limited and often erroneous, unreliable, unvalidated, irrelevant or otherwise inappropriate data to attempt to extrapolate the conditions throughout the Clark Fork River Basin in a failed effort to satisfy the requirements of 43 C.F.R. §§ 11.23-11.25 for the performance of a preassessment screen. The comments which follow note the more material problems of the Preassessment Screen but are not a comprehensive compendium of all of its deficiencies.

Preassessment
Screen
Section No.

Comment

2.1 The brief history set forth in the Preassessment Screen fails to mention placer mining operations. This omission misrepresents the baseline conditions in the Butte area prior to the commencement of hard rock mining, milling, and smelting.

Placer mining during the period 1864 - 1870, and subsequently through the 1930's, caused significant resource injury to Silver Bow Creek prior to and during the period of hard rock mining activities in Butte. Silver mining (producing wastes containing silver, mercury, and probably lead, zinc, and copper) was extensive in Missoula Gulch, a tributary of Silver Bow Creek, during the period 1867-1873 as well as during the heyday of Butte copper refining and was not part of Anaconda's operations.

No mention is made of the other mining activities in the upper Clark Fork River watershed to which Anaconda was not connected. These other mining activities released material other than sediment that are known to be toxic to aquatic organisms, including mining on tributaries to Warm Springs Creek (primarily gold hardrock and placer), the Little Blackfoot River (gold hardrock and

placer), Brock Creek (phosphate), Gold Creek (gold placer), Flint Creek (phosphate, gold placer), or Bear Creek. The silver-lead-zinc-manganese mining and concentrating at Philipsburg have resulted in releases of heavy metals and arsenic to Flint Creek (Johnson and Schmidt 1988; E.V. Axtmann and S. N. Luoma, 1991, Large-scale distribution of metal contamination in the fine-grained sediments of the Clark Fork River, Montana, USA; Applied Geochemistry, 6: 75-88.)

- 2.3.1 The State ignores the fact that placer mining occurred in the area and that, in fact, these operations severely degraded the local environment.
- 2.3.2 The State concludes that "[m]ultiple, and at times continuous, releases of hazardous substances from these ponds to surface and groundwaters has occurred repeatedly from the 1880s through the present," but offers no factual basis for this statement.
- 2.3.3 Multiple releases have no significance in a natural resource damage assessment unless they resulted in injury after December 11, 1980. Indeed, the applicable regulations (43 C.F.R. § 11.24 (b)(1)(ii) and (2)) charge the State in the Preassessment Screen to determine and separate out releases before that date because they may not be considered in an assessment. Even if the State could demonstrate that multiple releases have occurred in the past, it must demonstrate continuing injury.
- 2.3.4 Tailings were probably distributed along the floodplain only after the flood of the late 1800's or during the flood of 1908.
- 2.4 Neither Section 2.4 nor any other information in the Preassessment Screen provides any information on the "time, quantity, duration and frequency" of any alleged release of any of the listed substances as required by 43 C.F.R. § 11.24(a)(1) or the factors required to be addressed by 43 C.F.R. § 25(a)(2) --

"...the circumstances of the... release, the characteristics of the terrain or body of water involved, weather conditions, and the known physical, chemical and toxicological properties of the...hazardous substance."

- 2.6 The assessment of relevant operations fails to discuss factors of which the State is aware and, indeed, has reported on (i.e., irrigation losses of water, habitat losses and inputs from other sources such as sewage treatment plants) that affect natural resources. In fact, the State has written documents discussing the impacts of these factors. Significant settlement by non-native Americans has occurred in the Upper Clark Fork Watershed since the early 1860's. During that time, they have grazed cattle over most of the watershed; appropriated most of the surface water for irrigation; mined metals and industrial minerals; constructed a military road, ranch roads, forest roads, county roads, state, U.S. and Interstate highways; built two through-going and several spur or short-line railroads; cleared power-line rights-of-ways; harvested timber on the hillslopes; constructed one large and several smaller towns; constructed industrial facilities; and otherwise altered the landscape. These activities cannot be dismissed when discussing the potential injury to natural resources, because they are part of the baseline against which any injury to be charged to hardrock mining must be measured.
- 2.8 A portion of the mass of arsenic and heavy metals that have been released to surface waters in the last 20 years were discharged pursuant to MPDES permits and are specifically exempted from CERLCA liability.
- 3.1 The State's pathway identification process is flawed. The pathway analysis should provide evidence for an exposure link between hazardous substances and natural resources. The citation of volumes of material presented in subpart (a) does not establish the pathway. The statement "[d]irect contact may occur..." and the citation of Tetra Tech (1987) do not provide evidence of a pathway. Moreover, Johnson and Schmidt (1988) is not a scientific report and does not provide

evidence of injury to vegetation resulting from aerial deposition.

As 43 C.F.R. §11.14 (dd) of the regulations defines "pathway" as "... the route or medium through which...a hazardous substance is or was transported from the source of the ... release to the injured resource", the quotation of the tonnage of potential hazardous materials is not relevant to the identification of "pathway(s)" and, in addition, seems to be overstated. The tonnages noted more likely reflect total production numbers than any amount or proportion involved in a "direct contact" by any "pathway" linking materials to natural resources.

No unique cause-and-effect link between soils alleged to have become metals-enriched via airfall deposition and low vegetative cover have been established in modern studies of the area adjacent to the Anaconda Smelter. Low vegetative cover may result from a number of other causes including physical disturbance, latitude, elevation, and climatic conditions.

Beyer (1990) also cites documents demonstrating that uptake of inorganic contaminants from the soil is significantly influenced by various soil parameters (pH, organic content, the presence of other minerals). These factors were not taken into consideration by the State when evaluating the potential for biotic uptake of soil contaminants for the sites under evaluation which would greatly influence potential injuries to vegetation.

The concentrations of copper and arsenic in floodplain soils given in this paragraph represent the most extreme conditions found on the floodplain. These data are from a study by Moore (1985). The extreme values presented in the Preassessment Screen are for near-channel "slickens" deposits less than 1000 feet downstream of the confluence of Silver Bow Creek and Warm Springs Creek. Furthermore, Moore specifically sampled bank materials that appeared to be rich in tailings. This resulted in samples that are not representative of the entire floodplain.

- 3.1(b) It should be recognized that it is not strictly valid to cite the Ingman and Kerr (1990) results as evidence of exceedences of water quality criteria. Ingman and Kerr (1990) reported "monthly average" values based on one or two instantaneous grab sample taken at a location, not multiple samples over a one hour or four day period. U.S. EPA water quality criteria on the average concentrations of materials not to be exceeded more than once over a stated time period. Comparison of concentrations from instantaneous grab samples to criteria developed on time-averaged bases is insufficient evidence of exposure of aquatic life to adverse conditions.
- The EPA water quality criteria are based on the toxic effects of the dissolved form of the subject material. In contrast, Ingman and Kerr (1990) reported analytical results based on "total recoverable" metals methodology. Thus, the Preassessment Screen fails to consider "...known physical, chemical, and toxicological properties of the ... hazardous substance" as required by 43 C.F.R. § 11.25(a)(2).
- 3.1(e) The concentrations of metals in the food chain pathway in the Clark Fork River have not been clearly shown to bioaccumulate to metal levels that are injurious to the species sampled. Moreover, the State has not raised mercury effects through food ingestion as an issue warranting consideration in basin-wide sampling programs (Ingman and Kerr 1990). Therefore, the Phillips and Buhler (1978) citation should be removed as it implies an injury which has not to date been documented. The source and release of mercury are not documented in the Preassessment Screen and should not be the basis for presuming injury to natural resources in the Clark Fork River.
- 3.1(f) This section fails to acknowledge that natural erosion of upstream ore deposits would distribute particulates enriched in metals into the mainstream of the Clark Fork River, while tributaries lacking upstream ore deposits would naturally have sediment less enriched with the same metals. The Preassessment Screen cites Johnson and Schmidt (1988) for the proposition that average concentrations of floodplain

sediment copper and arsenic are "several orders of magnitude greater" than uncontaminated tributaries. The Preassessment Screen, however, ignores the fact that elevated levels of contaminants do exist in some Clark Fork River tributaries (e.g., arsenic concentrations in Flint Creek are 126 mg/kg).

- 3.2.1 The State of Montana appears to be attempting to establish a claim for natural resource damages on privately-owned depositional areas (e.g., slag areas, flue dust, and waste rock). The State has no jurisdiction or authority as a trustee over such areas.
- 3.2.2(e) The Preassessment Screen inaccurately cites Johnson and Schmidt (1988) for the proposition that there are "...at least 300 km³ of contaminated soil and vegetation surrounding the Anaconda site." Johnson and Schmidt make no such assertion.
- 3.2.2(f) Warm Springs Ponds were developed as water treatment and sediment containment structures, built to protect downstream areas from the effects of mining and smelting wastes. Water discharges from the Ponds which were authorized under permits issued by the State in the past constitute a basis for exclusion of liability under 43 C.F.R. §11.24(b)(i) and, thus, may not be considered in any assessment.
- 3.3 Alloway's estimates of background soil concentrations demonstrate the large range of expected values. It is very likely that even soils from mineralized areas fall within the ranges given. The values for sediment quoted from Camp Dresser & McKee 1989 b are too low, especially for zinc. Worldwide crustal averages for zinc are at least 70 ppm (Mason and Moore 1982). Tetra Tech (1987) reported background zinc concentrations near Townsend, Montana between 56 and 95 ppm.
- 3.3 (Tbl 2) Table 2 misrepresents the level of contaminants associated with injured natural resources (especially the geologic resources). Concentrations of metals are by and large only reported for waste sites (e.g., tailings, soil under tailings, slag) and do not represent

general soil concentrations beyond the waste areas.

Soil sample values listed for Opportunity, Valley, Inversion, and Crackerville are from the 1987 study of soil concentrations resulting from airfall deposition. The State cites the largest values for each transect (located nearest the smelter and on untilled sites for the 0-2 in soil horizon), rather than some estimate of the mean value for each transect.

Ray (1983) clearly states that these samples were collected from "metals-enriched fluvial sediments" (i.e., floodplain tailings) rather than floodplain soils at randomly selected locations.

The values given for Clark Fork River water quality include maximum and median values, but no minimum values. For instance, the 630 ug/L value for copper at Deer Lodge is representative of a moderate flood (February 1986). No subsequently measured values have been nearly this high (concentrations during annual peak discharges have been 150 ug/L), as indicated by the substantially lower median value.

- 3.3(Tbl 2) "Max" concentrations are not "Representative..." concentrations as the title suggests. The values presented in the Table do not meet the information requirements of 43 C.F.R. §11.24(a)(1).
- 3.3(Tbl 3) Table 3's title "Representative Concentrations," is misleading and inaccurate. Values presented in Table 3 are the higher values reported in the citations given for this table. Therefore, the table presents worst-case concentrations, not representative concentrations.
- 3.3(Tbl 4) Table 4 contains hardness-dependent criteria published by EPA (1985, 1987). These criteria are based on evidence that the dissolved portion of the constituent concentration is the only portion potentially toxic to aquatic organisms and that potential toxicity decreases in accordance with increasing hardness due to a quantitative shift in chemical species concentrations. It is misleading to compare the

"total recoverable" concentrations in Table 3 with exposure levels for dissolved constituents that might be toxic to some aquatic life. The values presented in Table 3 contain a high percentage of arsenic and metals artificially extracted from particulates that would not constitute an exposure to aquatic organisms in the Clark Fork River.

- 3.3.3 The cited ranges of arsenic, copper, and zinc in "surface water" do not agree with the Table 6 and 7 values in Ingman and Kerr (1990). The ranges for copper (<1-120 ppb), zinc (<0.5-354 ppb), and arsenic (<1-36 ppb) are substantially less than the values reported in this section of the Preassessment Screen. The reported values appear to correspond to median and maximum values reported on page 3-67 of Johnson and Schmidt (1988), associated with a brief high run-off period in 1986 where more than 95 percent of the copper was sequestered in the suspended solid form. Since this form is non-toxic, the values reported should not be construed as a basis for presuming resource injury.
- 3.3.4 Data on concentrations reported in the Camp Dresser & McKee, 1990b report are based on unvalidated data, as stated on page 4-1 of the report.
- 3.3.5 Presence of heavy metals in plants and animals does not necessarily indicate harm to the organisms. For example, the Ambient Water Quality Criteria for Copper - 1984 (EPA) quotes Shuster and Pringle (1969) "that the eastern oyster could concentrate copper 28,200 times during a 140-day continuous exposure to 50 ug/L. Even though the tissue of the oyster became bluish-green, mortalities were only slightly higher than in controls." The EPA criteria document concludes that "because no maximum permissible tissue concentration exists, neither a freshwater nor a saltwater Final Residue Value can be calculated for copper."
- Given the bioconcentration factors quoted by EPA (the highest for a fish was 290 for the fathead minnow), the numbers attributed to Van Meter (1974) are suspect. Assuming a copper concentration in the water of 20 ug/L, a liver

concentration of 11,400 ppm would require a bioconcentration factor of 570,000 for rainbow trout. This is far beyond that reported for the filter-feeding oyster which seems to imply sampling error. It is also about one order of magnitude higher than reported for the Clark Fork River by Phillips and Spoon (1990). Moreover, it should be noted that the Van Meter paper was not used by EPA in writing the 1984 copper criteria. Thus, the Van Meter paper should be examined closely before being cited in the Preassessment Screen.

- 3.4 The State of Montana has not provided any data showing that the air resource is injured. No reference has been cited that indicates that vegetation or wildlife resources have been affected. Table 5 does not list any species other than aquatic species (fish, invertebrates, and plants). The exposure and pathway discussions provided earlier are highly speculative, especially for wildlife resources.
- 3.5 The State of Montana does not provide any evidence that the services identified for air have been injured. At best, air should be identified only as a pathway. No evidence has been provided to indicate that consumptive and/or non-consumptive services provided by wildlife have been affected. Given that State agencies maintain hunting and trapping records, it is surprising that the State does not proffer data from such records to support its claim that these services have been affected.
- The State provides no evidence that primary and secondary contact recreation has been affected. Alleged injuries to surface water and to services provided by surface water are only based on exceedences of ambient water quality criteria.
- The State also claims that drinking water, irrigation of crops, and livestock uses of both surface water and groundwater have been affected. However, no comparison to relevant standards of guideline values was made in the Preassessment Screen. Table 2 reports groundwater metals concentrations for monitoring wells which are typically placed in areas containing surface deposits (e.g., tailings) and

do not represent regional groundwater conditions. The State reports no data for wells used for drinking, irrigation or livestock watering.

4.3.1 The data listed in this paragraph apply to Silver Bow Creek only, and are not representative of the quality of discharges from Warm Springs Ponds or the general quality of Clark Fork River water.

Ingman and Kerr (1990) are quoted for the proposition that "toxic levels of copper, zinc, lead, and cadmium were frequently exceeded (for hardness of 100 mg/L (ppm as CaCO₃)." The "toxic level" concentration is taken from EPA water quality criteria. Again, because metals were reported as total recoverable, and there was no estimate of the biologically available component (the ambient dissolved concentration), the chemistry data may not be used to predict whether the metals would have been at lethal or even sublethal concentrations in the water. This comment applies equally to other references to early water chemistry studies because almost none of these studies reported dissolved metals concentrations, which are the chemical forms underlying the EPA Water Quality Criteria. Wherever in the Preassessment Screen "total recoverable" concentrations are used to imply that natural resource injury might occur or has occurred, the document fails to meet its obligations as stated in 43 C.F.R. § 11.25(a)(2). (See comments on Section 3.1(b), above.)

This section repeatedly cites data derived by methods inappropriate for concluding that toxic conditions exist or have existed in the Clark Fork River.

4.3.2 The State mistakenly identifies secondary drinking water values as a standard. They are not. Rather, they are a guideline and relate to the aesthetics of water quality not to potential hazards of using the water. No loss in use of groundwater should be implied by exceeding secondary drinking water guidelines.

The discussion implies that the concentrations of iron, manganese, and sulfate in groundwater

resulted wholly from mining and milling activities. These constituents are common contaminants throughout the region, even in areas where other contaminants (e.g., copper, cadmium, arsenic) are not present.

Paragraph 1 does not report that Camp Dresser & McKee 1990b states at page 4-1 that these data are unvalidated and at page 4-4 that PAHs are ubiquitous in the environment in the area of the Montana Pole site.

Paragraph 2 does not state the total number of domestic wells sampled by CH2M Hill (1991) for this study (80 wells), only one of which exceeded primary MCLs.

The State fails to indicate which constituents exceeded primary or secondary standards. The "at least one constituent" in 42% of the fifty wells sampled by the U.S. Geological Survey exceeded "primary or secondary" standards was probably manganese, a background constituent in groundwater of the area. Background water quality should have been considered.

The cited data should be reviewed to be sure they were acquired from "drinking water" wells rather than monitoring or agricultural wells. Exceedences of iron, manganese, and sulfate secondary standards have nothing to do with the allegedly hazardous substances at issue in the Clark Fork River Basin.

4.3.3

This entire section of the Preassessment Screen is flawed and disingenuous. Many of the citations used to support allegations have been misinterpreted or simply not understood. Further, while many of the citations purport to support the State's case, they have been selected from a larger body of literature that does not support the State's case. These errors are so frequent and obvious as to call into question the basic scientific reliability of this section of the Preassessment Screen. The State's effort is transparently cursory, which is particularly reflected in the absence of much of the literature or data readily accessible in any university library or in the State files. The State has simply not put adequate effort into the

task of amassing a scientifically defensible preassessment screen for the Clark Fork River.

Specific Comments Although 43 C.F.R. §11.62 lists possible injuries to aquatic organisms, several of these categories of injuries are not associated with mining activities. For instance, there is no evidence that metal exposure, either water-borne or dietary, causes disease, genetic mutations or cancer in aquatic organisms. Furthermore, the State fails to present any evidence that suggests that conditions on the Clark Fork River cause behavioral abnormalities or physical deformations. Reports of fish kills on the Clark Fork are not exclusively linked to mining-related activities.

There is little evidence that laboratory test levels of copper, zinc, cadmium, and lead cause as great a degree of toxicity under field conditions. The studies cited (1-9) were all laboratory studies which exposed fish, largely trout, to conditions in which all of the metal present would have been in the ionic form. In the natural environment, however, much of this metal would be present as either a salt, bound to organic molecules, or in particulate form. These forms are not toxic to fish. Interestingly, the studies by Anadu et al. (1), Dixon and Sprague (2), and Bradley and Sprague (5) all show that exposure to elevated but sublethal concentrations of copper or zinc lead to greater resistance of the fish to higher concentrations of these and other metals. In other words, the fish became less sensitive to elevated metal levels. In addition, Lauren and McDonald (1987a,b) have shown that fish can acclimate physiologically and biochemically to elevated levels of copper. The Beisinger and Christensen (10) citation (not Christensen) refers to the water flea, *Daphnia magna*, not the brown bullhead, as the State claims.

Chakoumakos et al. (8) are quoted as saying that "the high heavy metals content is also lethal to westslope cutthroat." These authors did not examine either brown or rainbow trout in this study. They reported LCD50s ranging from 15.7 ug Cu/L at a hardness of 26 mg CaCO₃ to 367 ug Cu/L

at 205 mg CaCO₃ for cutthroat trout. Rainbow trout are cited in the EPA water quality document for copper as having LCD50s ranging from 83.3 to 514 ug Cu/L at a hardness of 194 mg CaCO₃/L. These numbers are significantly higher than the criteria (21 and 34 ug Cu/L) at a hardness of 200 mg CaCO₃/L and might actually be used to show that the one-hour criterion (34 ug Cu/L) may be very conservative and perhaps overconservative in the case of rainbow trout under conditions found on the Clark Fork River. It appears that the Preassessment Screen has focused on the worst possible case data without regard to the actual conditions on the Clark Fork.

The Preassessment Screen alleges that fish kills are frequent on the Clark Fork River, but refers to a citation which is not found in the reference list (Averett, 11). No evidence was presented that provides a linkage between a source of contaminants and these fish kills, and no evidence was provided that show the etiology of injury. There are many potential causes of fish kills, including high temperature, low dissolved oxygen, high ammonia, and natural outbreaks of disease. High un-ionized ammonia in Silver Bow Creek frequently exceeds rainbow trout acute toxicity levels, but this and other non-mining related problems are not acknowledged in the document (12).

Both of the studies cited (13 and 14) were conducted in the laboratory and do not reflect conditions found in nature. Furthermore, the Baatrup (13) citation was published in a journal which does not undergo peer review; unfortunately, this article was not available for commentary at this time. However, Eric Baatrup is known primarily as an histologist and histochemist with publications related to mercury intoxication (Baatrup et al. 1989). There is no evidence that mercury levels on the Clark Fork River are high enough to cause such lesions. In fact, mercury levels on the Clark Fork are not given in the Preassessment Screen. Furthermore, while Baatrup et al. (1986) showed the accumulation of mercury in the kidney and liver of trout exposed to 100 ug/L (ppb) of mercury for 14 days in the laboratory, there was no evidence

of either physiological or biochemical dysfunction.

Nemcsok and Hughes (14) exposed trout to 200 or 2000 ug copper sulfate/L for 24 hours in the laboratory. The fish were confined and had catheters surgically implanted for the removal of blood samples. All of the copper present was in the ionic form, a condition not found in nature. The authors incorrectly concluded, on the basis of elevated plasma levels of several presumptive liver and/or kidney enzymes, that the exposure caused tissue necrosis. Necrosis is a histological term referring to the degradative process that follows cell death. Since these authors did not examine the organs alleged to be affected, no reliable data support the conclusion that necrosis was shown.

The elevation in tissue enzymes found in the plasma samples are indications of abnormal leakiness of the cell membranes and do suggest tissue damage. However, Trump et al. (1980) have shown that, given time, cells can completely recover from injuries that cause elevations of tissue enzymes. In fact, such injuries can result from a large variety of stressors including disease (Racicot et al. 1975), handling (Bouck et al. 1966), and hypoxia/anoxia (Scarpelli and Trump 1971). No deaths resulted from even the highest exposure concentration, even though catheterization is a significant additional stress. Thus, no linkage was shown between these biochemical biomarkers and death.

The citation of Biesinger and Christensen (10) as used in the Preassessment Screen is inappropriate. Those investigators apparently examined the effects of metals on reproduction in the arthropod, *Daphnia magna*. Since that animal does not have blood cells and is about 3 mm in length, it is impossible to credit that copper caused effects on fish "hematocrit, hemoglobin, and blood glucose" and "chloride cells and plasma protein," as the Preassessment Screen states.

Benedetti et al. (15) examined the morphological effects of copper exposure on brown bullheads, and Lauren and McDonald (3) examined the effects of copper on ion balance in rainbow trout. Both

studies were conducted under laboratory conditions where all of the copper present was in the ionic form. "Respiratory efficiency" is not a term used in fish respiratory physiology (Dejours 1975, Hughes and Perry 1976, Houlihan et al. 1982). Thus, it is difficult to determine the meaning of a "reduction in breathing efficiency" as that phrase is used in the Preassessment Screen. "Respiratory efficiency" could mean the balance of oxygen uptake for carbon dioxide release. If this is the intended meaning, Sellers et al. (1975) have shown that copper exposure does not cause a decrease in pO_2 or blood pH, or an increase in pCO_2 , as would follow from decreased gas transfer efficiency. If the papers by Lauren and McDonald (3) and Reid and McDonald (16) had been considered, it would have been clear that the only experiments performed were ionoregulatory, and had nothing to do with respiration. Furthermore, although, in this paper, copper was shown to disrupt sodium uptake and loss, a review of the literature would have revealed that Lauren and McDonald (1987a,b) later showed that trout are able to completely acclimate to elevated copper levels.

The 1987 Department of the Interior criteria document on Injuries to Fish and Wildlife does not provide the finding of immunological dysfunction with a rebuttable presumption due to the inconsistent result of immunological studies. For example, in the citation quoted, total suppression of the humoral antibody response by metals was only found in carp, not in trout. The concentrations of copper and chromium were more toxic to carp than trout and all carp were moribund within 11 weeks for copper and six weeks for chromium. When O'Neil (17) is examined in detail, it is evident that in severely stressed fish, it is impossible to distinguish between toxicity at a primary target, such as the antibody responsiveness of the lymphocytes of the immune system, and secondary effects due to imminent whole animal death. Certainly, many physiological systems begin to fail in moribund animals. In fact, continued exposure to nickel and zinc lead to enhanced titers of anitibodies. Furthermore, in a report not cited by the State, MacFarlane et al. (1986) exposed striped bass to five heavy metals and the common aquatic

bacterium, *Flexibacter columnaris*, and found enhanced survival of the fish. In the second O'Neil citation (19), decreases in antibody titers in brown trout were found under extremely artificial conditions including interperitoneal (IP) injection. Finally, handling stress and confinement can increase plasma cortisol levels (Barton et al. 1986) and decrease immune responsiveness (Tripp et al. 1987). Thus, laboratory studies induce an elevation of baseline stress not found in nature and which is expressed under laboratory conditions.

The Preassessment Screen states that "[e]xposure to cadmium, lead, and zinc" have "been shown to adversely affect fish health", but neglects to recognize that copper and zinc are essential nutrients without which normal growth and development are impossible. The Preassessment Screen only cites cadmium research for the proposition that "[l]ike copper, all three metals suppress the fish immune system."

Moreover, this statement is false and misleading because there is no evidence presented or cited that copper suppresses the immune system. The statement concerning adverse zinc effects on the nervous system is also meaningless without recognition of the vital role of zinc in normal neuronal development and specific citations of the levels and duration of zinc exposure that result in nervous or sensory system dysfunction. Reader and Morris (20), Reid and McDonald (16), Verbost et al. (21) and Verbost et al. (22) have all shown inhibition of calcium uptake across the gill or other ion transporting epithelia, but this has never been linked to any other physiological dysfunction or fish death.

The statement relating calcium fluxes across the gills to respiratory efficiency is another example of the poor technical basis for conclusions in the Preassessment Screen. Calcium is an ion that is actively transported across the gill, but calcium transport is in no way related to respiration, which is the exchange of oxygen and carbon dioxide. The difference between these two distinct physiological phenomena is a matter of elementary biology. Benoit (23) is not an electrophysiologist and did not present any

scientific data to support his interpretation. Furthermore, the cited levels of cadmium are greater than those on the Clark Fork River.

- 4.3.4 No evidence has been provided that contaminants are present in wildlife in the Clark Fork River Basin.

Like the previous section, the discussion on wildlife is cursory, and, in some cases, misleading. For instance, impairment of biological function at multiple levels of biological organization caused by metals is stated to potentially occur in birds, but the citation used refers only to furbearing mammals (24). No evidence of metal-induced toxicity to either birds or mammals along the Clark Fork has been presented.

The symptoms of abdominal pain, weakness, and lethargy referenced in Table 6 of the Preassessment Screen show that this table was derived from acute human clinical poisoning reports. Furthermore, without indicating the dosage of the metals cited, Table 6 is misleading because there is a threshold below which none of these effects is found. The references (25-27) to ingested lead refer to lead shot, not water-borne or dietary lead that is ingested by animals not living in areas frequented by hunters. Had the reviewer read the papers cited instead of taking them from a secondary source (Frederick (28)), this would have been obvious.

- 4.3.5(Tbl 7) No evidence, either qualitative or quantitative, has been provided to show that metals caused damage to plants along the Clark Fork River.

Data on Table 7 are very misleading. Concentrations of metals in grasses reported by Rice and Ray (1985) from locations slightly away from the slickens margin (on metals-enriched floodplain soils) at Grant-Kohrs Ranch are not significantly elevated above concentrations from their control plot. Moreover, the Smelter Hill data shown are not an appropriate comparison to MacNicol's data. Horsebrush is not a grass and coincidentally had the most efficient metals uptake of all species tested on Smelter Hill.

Taskey (1972) also notes that the lumber industry contributed to the economy in Anaconda during the late 1800's and early 1900's and that the local lumber supply was severely depleted by the early half of this century due to excessive and indiscriminate cutting. In addition, emissions from the milling process contributed to air quality in the region. The effects of the lumber industry on natural resource injuries claimed by the State of Montana need to be considered when evaluating impacts to forests and vegetation.

The data presented in Table 7 for horsebrush along the Clark Fork River are compared to grass and wheat, which is not an appropriate comparison. It is not clear from the table if the reference is to grass, wheat, or both. The comparison of grass from one region to another is not scientifically valid unless it is shown that the same species are being compared. The State's comparison becomes absurd at the point where horsebrush metal levels are compared to the grass and/or wheat levels. This compares apples and oranges. Furthermore, some plants are genetically programmed to bioaccumulate metals such as, B, Cd, Cr, Co, Cu, Pb, Ni, Se, and Sn. Certain plants are known to contain up to 10-25% nickel and other plants accumulate copper or arsenic. Without specifically comparing plants found along the Clark Fork with the same species found at a well-studied reference site, it is not possible to allege accumulation to toxic levels. Finally, the table does not clarify whether the units compared are wet weights, dry weights, or possibly wet vs. dry weights or a combination of all of the above.

It is not clear from the citations (32-35) that these results come from field or lab studies. However, it is unlikely that pigeon pea is indigenous to the Clark Fork River area. Furthermore, as in the State's previous allegations, the key factor of concentration has been omitted. Again, no evidence has been presented that lead or cadmium is even present in the ionic form in Clark Fork River Basin soils, or that any of the alleged injuries to plants occurs there.

The remaining points concerning cadmium (36), copper (37-38), zinc (37), and arsenic (39-41) are similarly flawed because they rely on laboratory results from studies on plants that are not indigenous to the study area.

In conclusion, the Clark Fork River Basin is an enormous area, and it cannot be concluded that potential injuries focused in one or two locations are representative of the whole region. Furthermore, no time line has been established to show that these injuries occurred after the period of organized mining. In addition, the Preassessment Screen wholly fails to account for the effects of placer mining, logging, agriculture, urbanization, other industrial activities and naturally occurring phenomena, climatic conditions etc.

4.5 In determining that a damage assessment should be performed, the State asserts, without any specifics whatsoever, that remediation carried out as part of the Superfund process will not sufficiently remedy injuries. The State offers no evidence to support this claim even though this factor must be considered before the State can proceed with an assessment. Consequently, the State may not proceed with an assessment.

Moreover, this conclusion is simply wrong. For example, remediation of Silver Bow Creek streamside tailings will significantly improve the soil resource in that area, and will also improve water quality. The current remedial measures at Warm Springs Ponds will significantly improve water quality. Natural recovery of floodplain soils adjacent to the Clark Fork River has already begun.

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MELVIN A. STOKKE

ENGINEERING CONSULTANT

ADMINISTRATIVE RECORD

February 24, 1992

Mr. Dick Pedersen
Natural Resource Damage Program Manager
Dept. of Health & Environmental Sciences
Cogswell Building
Capital Station
Helena, MT 59620

Subject: Assessment Plan Part I
Clark Fork River Basin NPL Sites, Montana

Dear Dick,

In the Executive Summary, Page ES-1, "The purpose of this Assessment Plan is to ensure that the assessment is performed in a planned and systematic manner". Then in the introduction, I quote, "Response actions carried out or planned pursuant to the RI/FS program will not sufficiently remedy the injury to natural resources without further action".

I have to criticize the above quotation on the basis of all the studies that were made quite recently and digging back into history. Page 49 thru 54 there are studies and reports that total up to 64 individual cases. In a lot of the areas the Record of Decision was given, after a lot of planning and discussions at public meetings, not taking into account the millions of dollars that have already been spent.

I think our Congressmen and the public are correct when they say EPA is dragging their feet by planning the project to death and not getting the work in the field accomplished. Now after reading this report, I feel the Dept. of Health and Environmental Science is in the same catagory as the EPA.

At this point in my comments, I would like to use as evidence the following and I enclose copies:

Appendix: Updated schedules for Clark Fork Superfund Site projects.

Page 6 & 5 conclusions

I have checked and underlined the reasons for the delays in the project.

On the bar chart of schedules, the record of decision for the Old Works - Golf Course now shows a date of the last 2 quarters

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of 1993 and the 1st quarter of 1994. Originally the ROD was scheduled for the 3rd quarter of 1992. Remedial action is now scheduled for 1995 and the 1st quarter of 1996.

The above two illustrations are just a part of the reason that I say the DHES is now following in the footsteps of the EPA.

6.2 Biologic Resource Fisheries (Page 15)

Fish in the Clark Fork River have been and continue to be exposed to hazardous substances through both direct exposure to contaminated surface water and sediments as well as through food-chain exposure to contaminated prey. I am enclosing an article that was printed in the Anaconda Leader, dated Wednesday April 11, 1984. It is interesting to note that the fishery starting at the Warm Springs bridge was far more populace and thriving than further down stream.

1.0 Introduction (Page A-1)

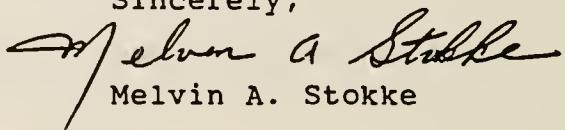
This Quality Insurance Project Plan addresses procedures to assure sufficient precision, accuracy, completeness, representativeness and comparability of field and laboratory data generated in the assessment.

Then after forming a project organization with responsibility, providing for QA/QC targets for Chemical data, and seeking Data Quality objectives you will arrive at the information in Table A-2. After all the time, money and effort it shocks me to read the data in this table and I quote the following:

<u>MATRIX</u>	<u>ACCURACY</u>	<u>PRECISION</u>
1. Soils, sediments & tailings (elements)	50%	50%
2. Plant Tissue	50%	50%
3. Ground water & surface water	25%	25%
4. Soils, sediments, tailings (organic carbon)	35%	35%
5. Ground water & surface water (total sulfate)	25%	20%
6. Ground water & surface water (chlorine)	25%	20%

After reading all the procedures for securing samples, processing them and recording data, I still say this project is a waste of time and money when a person looks at the accuracy and precision of the data. An educated guess would achieve the same results.

Sincerely,



Melvin A. Stokke

cc: S. Stash
G. Vuckovich
J. Davison

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My name is Albert Molignoni I am a resident at Rocker Montana I am also a board member of C.T.E.C and chairman of the County Water + Sewer Dist of Rocker

(What is our water worth)

As a board member of the County Water and Sewer Dist of Rocker, we pay to our supplier of domestic water about \$1.40 per 1000 gallons of water. At previous meetings of our C.T.E.C committee, it was told to us that about 5000 gallons of water per minute flow into the Berkeley Pit. This amount of water equals \$7.00 per minute, \$420.00 per hour, \$10080.00 per day, \$3,679200.00 per year. Also the 20 billion gallons of one-time clean water in the Berkeley Pit could have been sold at todays prices for 28 million dollars. I cannot understand why Arco or anyone else has the right to contaminate such a valuable commodity that the State of Montana owns.

We were also told at previous meetings that if a property owner has contaminated soils on there property and are digging a basement it will be the property owners responsibility to dispose of

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it to a repository that can accept this type of soil. It was also mentioned at this meeting that a property owner would be responsible for this soil in the repository. This places a terrible burden on the people who had nothing to do with the contamination in the first place.

Just because our area is unique in minerals that someday will not be mined, is all the more reason that the State of Montana makes sure this area is cleaned up for future generations of people that would want to utilize the water and property in our area.



MISSOULA

March 13, 1992

ADMINISTRATIVE RECORD (406) 721-5700

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NATURAL RESOURCE
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Mr. Dick Pederson
Natural Resource Damage Program Manager
Department of Health and Environmental Sciences
Cogswell Building
Helena MT 59620

Dear Dick,

The Missoula City/County Health Department appreciates the opportunity to comment on the draft Assessment Plan, Part 1, for the State's natural resource damage claim against the Atlantic Richfield Company. Please keep us posted on this important effort. We look forward to reviewing Phase II.

The Missoula City/County Health Department strongly supports the state's Natural Resource Damage Claim. We also support the State's decision to proceed with the planned natural resource damage assessment. We urge the State to perform a very complete assessment of natural resource damages in the Clark Fork watershed, and to make every effort to collect damages for injuries to those resources. We would vigorously oppose any effort to settle the state's natural resource damage claim before an thorough assessment of damages to the state's resources has been completed.

As you know, Dick, the Missoula City/County Health Department is very interested in the groundwater resource at the Milltown Reservoir site. We are concerned with your definitions of injury to groundwater resources, presented on page 46 of the draft assessment plan. While federal drinking water standards, such as those included in the federal Safe Drinking Water Act, are important considerations in determining injury, we do not agree that they should be the main threshold in determining injury. Federal drinking water standards represent the maximum amount of pollution that regulatory agencies should allow to protect human health, or in some cases the environment. The standards do not represent an acceptable level of water quality. When water quality at public water supply wells reaches or exceeds the federal standards, our agency is obligated to order corrective action or discontinued use of the water supply. Once we reach the standard, the water is too polluted to use. Injury to the water supply occurs before its quality reaches the standard. We are concerned that your reliance on standards for determination of injury will weaken the state's ability to collect sufficient damages to restore or replace damaged groundwater resources. For instance, will the state determine injury to the Milltown area aquifer based on exceedences of drinking water standards for arsenic? If so, will damages be assessed based only on the duration of exceedences of water quality standards? If so, will damages be sufficient to pay for restoring the damaged groundwater resource to the extent that it can again be used as a public water supply? Will damages be

COMMENTS OF THE CLARK FORK - PEND OREILLE COALITION
ON PART I OF THE STATE OF MONTANA'S ASSESSMENT PLAN
FOR CLARK FORK RIVER BASIN NATIONAL PRIORITY SITES

March 1992

General Comments

1. For the benefit of the public and the court, the plan should contain more detailed description of the resources affected and their geographic spread. Assessment plan regulations require "descriptions of the natural resources and the geographic areas involved" 43 CFR 11.31 9a)(2). Though the plan has descriptions of the four resources being assessed, they are piecemeal and of varying levels of detail. The same regulation also says the plan should include "sampling locations within those geographical areas, sample and survey design, numbers and types of samples to be collected, analyses to be performed, preliminary determination of the recovery period...." For the most part, with the exception of the fishery portion of the plan and what can be inferred from QA/QC, the plan contains little of this information to satisfy this requirement.
2. It is not clear how the State has met the requirements of 43 CFR 11.32(a), especially the coordination with federal trustees. Section 11.32(a)(1)(B) implies there should be more federal involvement -- perhaps even a leading role -- in some parts of the plan.
3. It would help the court and the public if specific sections of the plan referred to specific regulations, so it could be gauged how the State is complying with the CFRs. For example, it is unclear how Section 5.0 fits into the regulatory scheme. (Though the section has important information).

Assessment Plan

Comments are referenced to pages in the plan

- p. 9. How much notice will the State be providing to ARCO for opportunities to collect split samples? Is the notice a general notice, or will one be provided every time the State is sampling? Is ARCO providing the same type of opportunity for the State? Any costs to the State for providing such notice should be billed to ARCO.
- p. 11. Though preassessment screening provided "a preliminary list of substances," the plan does not show how it will finalize screening for hazardous substances at each site for each potentially injured resource. In fact, aside from metals, the plan hardly mentions how final screening will occur for other hazardous materials such as PCP, creosote, VOCs and polycyclic aromatic hydrocarbons, as well as secondary chemical compounds.
- p. 13. It should be recognized that other metals also often exceed water quality criteria in the Clark Fork and its tributaries. In fact, in some reaches, arsenic is just as persistent if not more available than copper, cadmium, zinc and lead.
- p. 13. The footnote mentions EPA recommendations on the use of total recoverable metals

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concentrations. We strongly recommend that all metals-related injuries for in-stream biological and physical resources be based on concentrations of total recoverable metals. Though ARCO in CERCLA remediation argues that only dissolved concentrations should be considered, plenty of scientific evidence exists showing that undissolved fractions in stream systems can easily become bioavailable through food chain exchanges or changes in the environment.

p. 20. What analytical techniques were used for the metals concentrations cited for groundwater (ie., State of Montana total recoverable, EPA acid soluble, EPA dissolved, etc.)? Without looking at the referenced studies, we presume the concentrations are for a dissolved fraction, though they could have been arrived at in each study using different analytical methods. It's important to ensure that when these studies are used collectively for assessing injury, that results are not rendered inconclusive because incompatible analytical methods were used. If the plan is to include additional groundwater monitoring (and we note with regret that apparently there will be little new groundwater data collected), we suggest considering using a total recoverable method at sites that include shallow groundwater in coarse material, such as near Warm Springs Ponds. Non-dissolved fractions (attached to microscopic soil or organic material) can still move through these systems and eventually become biologically available (much like the nondissolved fraction in a stream).

p. 25. Who will be evaluating the quality of data for the State? Will those persons be the same throughout the assessment phase? It's important for QA/QC reasons that it be the same people.

p. 26. Amphibians should also be considered "biological pathways."

p. 28. It appears the State will be considering exceedences of standards to be the main threshold for determining whether surface water resources have been injured. This is too conservative. The State, especially when it has the benefit of control sites, should consider **nondegradation** to be the standard. In fact, the Montana Water Quality Act, federal Clean Water Act and valid scientific research recognize that beneficial uses and biological resources can be impaired by concentrations of pollutants below standards but above background levels. Though the definitions of injuries in DOI's rules appear to favor water quality criteria as the threshold for determining injury, the rules also state that there are other concentrations and durations of substances that can be considered sufficient to cause an injury. We therefore recommend when background concentrations can be reasonably inferred and where detection limits do not preclude high confidence in data, that degradation be considered potentially sufficient to create injury. This could extend the geographic extent and intensity of injury for many areas with surface water.

p. 29. How are "potential future uses" defined? Are they the same as, to use the State's lexicon, reasonably foreseeable beneficial uses?

p. 29-30. Again, the injury determination for surface water resources should include levels below water quality standards and drinking water criteria but above background levels

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determined from control sites.

p. 29. It may be very difficult to find "flow regime" criteria for control sites that replicate the reaches of the Clark Fork below the Little Blackfoot River. There are few rivers of similar size with pristine water quality.

p. 30. Will a determination of injuries based on metals concentrations consider all discharge levels of the affected streams? Because metals concentrations fluctuate throughout the year, we recommend that occurrences of injury be examined during peak flows, base-flow and during rising or falling branches of the annual hydrograph.

p. 31. If all four *"acceptance criteria"* [43 CFR 11.62(f)(2)] have to be met in order to determine an injury, the State has a problem. The second criterion for biological resources says that exposure must be known to cause the biological response *"in free-ranging organisms."* And that it has to have been documented in *"a natural ecosystem..."* The definitions of *"free-ranging"* and *"natural ecosystem,"* when it gets down to brass tacks (and lawsuits) can be topics of endless, inconclusive scientific dispute. Moreover, the third criterion says, *"Biological responses that have been documented only in controlled experimental conditions are insufficient to establish correlation with exposure occurring in a natural ecosystem."* Does the State feel its research plan for fishery toxicity, which is heavily dependent on laboratory work, meets these criteria.

p. 33. Brown and rainbow trout are not native, and it's probable that their occurrence in the upper Clark Fork before the mid-1960s was limited. Browns may also be the most metals tolerant salmonid in the drainage. Therefore, how can the State's research plan and injury determination for fisheries be based solely on damages to the populations of these two species? Will historical populations and the biological response of native trout to pollution be inferred from information gathered on two nonnative species, especially two that have a higher tolerance to pollution? It is generally recognized from historical observation that westslope cutthroat and bull trout, both state-listed sensitive species, are native to the upper Clark Fork. How will the State factor in the injury to the populations of these species, as well as determine damages for both? It may very well be that an individual westslope cutthroat or bull trout, given their dwindling numbers, is now more valuable than an individual of the other species. If the State will be determining injury only on brown and rainbow populations, it will be ignoring the loss of a tremendous and largely foregone resource, the Clark Fork's native fishery.

p. 34. We are puzzled why there is no protocol to determine the effects of metals on aquatic invertebrates and other trout prey. The protocol examining invertebrates looks at them only as a pathway for transferring metals to fish, focusing on the toxicological effects on the trout. That's fine as far as it goes. However, this largely ignores how metals affect the prey. If metals adversely affect the prey (and they do), it's reasonable to assume that the pollutants can reduce prey populations. It follows, then, that with a reduced food source trout populations (as well as numbers of other invertebrate predators) could also be reduced. That would constitute an

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injury. Though the DOI rules apparently don't directly address food chains in this fashion, if necessary it could be argued that the rule citing reduced fish reproduction as an injury could apply. Less food may mean more stress in trout and therefore more susceptibility to metals pollution and other stresses; a result would be less trout reproduction.

p. 35. Why are the test and control waters formulated to simulate spring chemical conditions? What are "spring" conditions? In the upper Clark Fork, concentrations of certain metals are always high, often exceeding in-stream water quality criteria for other times of the year. For example, there are data that show that some heavy metals concentrations are highest in winter. Other data show high arsenic levels in some reaches during summer.

p. 37. Why will fish be collected in spring from the Clark Fork test sites? Why not also during the fall when base flows occur and when brown trout are stressed from spawning?

p. 41. The description of the comparison of trout densities for control reaches does not account for species differentiation. Isn't density affected by population composition? What are the differences in potential density for a population in a given reach when it includes a voracious non-native predator such as the brown trout? What is the density when it's comprised of just native species?

p. 43. In order to determine the areal extent of the injury to sediments, it seems that stream channels must be defined. What is the working definition being used?

p. 43. It seems injuries to sediments from metals contamination is really an adjunct to injuries to water quality and biological resources. In order to determine an injury based on whether pollutant concentrations are high enough to classify sediments as hazardous waste under RCRA, it would seem these materials might be exempted wastes (CFR 40 261.4(b)(7)).

p. 45. Why are sediment samples not being tested for VOCs, PCBs or other chemicals? Has the State concluded their presence would not be the result of releases at the NPL-related sites?

p. 46. Again, we encourage the State to include, where practical (as mentioned above for surface water), the applicability of the nondegradation standard when determining groundwater injury.

p. 46. Why will no groundwater assessment be done in the Deer Lodge Valley where contaminated soils from smelter emissions could be contributing to groundwater pollution?

p. 46-47. Does the statement "Limited field sampling will be conducted to document pre-disturbance condition in a control area" imply that no new wells will be drilled? If so, is the State confident it has an adequate control site in Butte?

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Appendix

We feel that QA/QC is one of the most critical components of the assessment. Therefore, we had hoped it would have been detailed more in this plan. We assume the State's operating QA/QC procedures are spelled out in more detail. For example, we assume there is available a more detailed custody flow chart and set of procedures to report deviations.

It is unclear how the QA/QC plan relates to data collection that has already occurred. For instance, ground and surface water data as well as sediment data that have already been collected for RI/FSs and other documents will apparently be used. Will the QA/QC plan be applied *a posteriori* to these data? It is also unclear what the overall process will be to review and validate data. Finally, the plan would be more clear if it included flow charts, diagrams, timetables and mileposts for different steps in the research plan. The plan should clearly state objectives and when they will be met.

A-1. A complete table of laboratory analysis methods and analytes/media would be useful for the reviewer of this plan.

A-2. Have all assessment personnel been assigned (field, lab and administrative)? Will they remain constant throughout the assessment period? If possible, they should remain the same. The assessment plan and QA/QC charts should list people and their responsibilities.

A-6. Detection limits are in parts per billion, but specific data quality objectives in parts per million. Background levels and even some water quality criteria, it seems, may be best measured in units of parts per billion. Is there any way to make measurement units uniform to avoid transposition errors that could call into question QA? It may not be that big a deal, but it's somewhat confusing as to what the state is thinking.

A-7. Are the accuracy and precision objectives in Table A-2 considered acceptable in studies that involve legal liability? They seem awfully broad. We understand the difficulty in dealing with the complicated analysis involved, but data confidence is crucial. The objective for accuracy and precision should always include the highest confidence goals possible. Fifty percent includes an awfully large range, and it seems the analysis could reduce it considerably.

It is unclear why some of the analytes are being used. For example, why chloride and total sulfate for ground and surface water? We can only guess (ie., Are there chloride or sulfide characteristics in the mining waste that are not present in background water quality?). Why is plant tissue included in part I? Isn't vegetation supposed to be in part II? Regardless, 50 percent accuracy for plant tissue is too large a range. Ten to 15 percent, at least, could be achieved.

A-9. What procedures will be in place if initial and continuing calibration get out of control?

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A-12. Samples must be of sufficient size not only to attain detection limits but also to rerun samples when needed. Field replicates, duplicates, or splits should not be identified on the sample container or any information given to the laboratory. Blind evaluation is critical to unbiased analysis. This, of course, is standard QA procedure but it's not stated in the plan.

A-13. Does the word "may" in the first line imply that there is discretion involved in QC sampling? Or does it imply that these QC sample types will be used in various QC plans? It's important to establish upfront minimum QC standards, and that personnel be given discretion to increase the number of QC samples, but never to do anything less than the minimum.

RECEIVED

MAR 16 1992

NATURAL RESOURCE
DAMAGE PROGRAM

Phil Tourangeau
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(406) 728-5549

March 13, 1992

Dick Pedersen
Natural Resource Damage
Program Coordinator
Environmental Sciences Division
Montana State Department of Health
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Helena, MT 59620

ADMINISTRATIVE RECORD

Dear Dick:

The following are comments on the Natural Resource Damage Program Assessment Plan. If you have a questions about these comments, please contact me at your convenience. As I interpret item 5 in the Notice of the Assessment Plan, dated January 27, 1992, your office will provide the State's responses to comments at the conclusion of the Assessment. I would hope to discuss these comments with you prior to then. Thanks for the opportunity to comment.

Section 2.0 Coordination with RI/FS

This section consists of two paragraphs: the first paragraph contains a very general discussion of the problems in the Clark Fork basin; a description of the operable unit system; a brief discussion of the role of lead agencies, and ARCO's participation; and recognition that Superfund response will probably continue beyond the turn of the 21st century. The reference cited for this paragraph is the 1990 Clark Fork Superfund Master Plan.

The second paragraph presents a description of the coordination between the NRDp and the Superfund lead agencies. The coordination has apparently consisted of communication with project managers; the providing of reports to NRDp by the lead agencies; the providing of the Pre-Assessment Screen and the Assessment plan to the Superfund lead agencies by the NRDp; and mention of one instance where certain procedures have been agreed upon to permit the inclusion of NRDp data into the RI/FS for one operable unit.

While the narrative presented in this section is informative and shows evidence of data sharing and "communicating", it does

not show how the NRDP activities will actually be coordinated with RI/FS activities at the Clark Fork sites.

For example, the ROD for soils and water at the Butte Priority Soils operable unit is not expected until late in 1995, and remedial action is not expected until 1998. It may be some time after this that actual improvements in Silver Bow Creek water quality will be realized from the remedial action. How will the schedule for this operable unit affect schedules for the NRDP? How will the NRDP incorporate resource recovery times from this remedial action into its assessment? What are the plans which NRDP has to incorporate data from the Priority Soils RI/FS into its database?

There will likely be improvement in Silver Bow Creek water quality resultant from the ERA at LAO, where implementation the ERA is expected to continue into 1995. How will NRDP coordinate with this action and incorporate the results in stream water quality into the assessment?

The same questions can be raised for each operable unit on the Clark Fork. The Assessment Plan does not detail how the NRDP will coordinate its activities with those of the several RI/FS activities. Such detail should be included in the plan, along with logic diagrams, schedule charts with milestones, action points, and sufficient narrative to elucidate specific relationships between the NRDP and the several RI/FS activities. In addition, the plan should show how data produced by RI/FS activities will be used by the NRDP, and what criteria the NRDP will use to determine useability of the data.

Several risk assessments will be conducted by the Superfund lead agencies as part of the RI/FS activities, and certain of this information should be useful to the NRDP. Similarly, data produced by the NRDP in the area of injury should be of interest the lead agency risk assessment efforts. How will NRDP coordinate these activities?

The Clark Fork Superfund Master Plan Draft Update was released recently. Do the schedules, problems and corrective actions detailed in the Update affect the NRDP? Have any schedules, operable units or decision points identified in the Update been changed since the preparation of the Assessment Plan? Did NRDP coordinate with the lead agencies on the Update?

The lack of a clear milestone chart for the NRDP activities in the Assessment Plan makes it impossible to see how NRDP activities interface or are correlated with RI/FS activities. The Plan should be revised to include such charts, and show the relationships between the two programs, including data products and their uses.

3.0 Procedures and Schedules for Sharing Data with Natural Resource Trustees and with ARCO, the Primary Responsible Party.

The Plan does not show how NRDP will coordinate with other Natural Resources Trustees, nor does the Plan provide schedules

for coordination of activities. The Plan merely states an intent to comply with the applicable DOI requirements. No evidence is presented in the Plan that NRDp activities will be coordinated with other Trustees, other than for the providing of validated data and the opportunity to obtain split sample.

Certainly, NRDp will not proceed without some level of interaction with other trustees. The Plan should identify the interaction (if any) contemplated by NRDp with other Trustees; provide schedules for such interaction and show the interrelationships, if any, between activities of the NRDp and those of other Trustees and the several RI/FS's. The Plan should also contain logic diagrams and milestone schedules relevant to these coordination efforts. A block diagram showing lines of responsibility for effecting coordination would also be valuable.

7.0 Research Plans

The Plan states an intention to use existing data which may be relevant to the NRDp and which has been collected under RI/FS actions, by academic institutions, and the various federal and state agencies. The Plan does not identify what kinds of data may be considered for use, and should do so.

The Plan states that the NRDp will "evaluate" existing (unspecified) data, apparently to decide whether data are useable. Please explain the definition of the term "evaluate" as used in the context of this section. What procedures will be used in the "evaluation"? Will a priori criteria be applied; if so, What are the criteria? Will the purposes of the collection of past data be considered in the "evaluation". If so, How?. Will the evaluation be coordinated with other NRDp activities, with RI/FS activities, with other Trustees? A significant RI/FS effort has been and will be expended on the identification, assembling and assessment of past data for the several operable units. Will NRDp make use of these efforts? If so, How?

The Plan provides several apparent criteria which will be used, at least in part, for the "evaluation" of past data. The stated criteria include "...quality, reliability, accuracy, timing of sample collection, spatial coverage...". What is meant by "quality", and how will it be "evaluated". Are there a priori criteria which will be used to determine "quality" of past data. What is meant by "reliability", in the context of the "evaluation" of past data? How will it be "evaluated"? How will accuracy be "evaluated"? Will laboratory data be included in accuracy determinations. Will sampling design be included?

The Plan states that "...other criteria, as appropriate." will be used in the "evaluation" What are these other criteria? Are they specific to certain types of data, such as emissions inventories, fish density sampling, air monitoring, etc?

Please provide a listing of the specific types of data to be "evaluated", the specific a priori criteria which will be applied to determine useability and how they will be employed. In addition, list the references for the past data to be

"evaluated". Commentors may be aware of possible data which the NRDP is not, or may have information on past data which the NRDP does not. Decision trees for the several types of data which show how the various applicable criteria will influence useability are necessary, also.

The Plan states that injury assessment for fisheries, surface water and sediments will be limited in downstream extent to the Milltown Reservoir area. Please define boundaries of the "Milltown Reservoir area" for each resource to be assessed for injury. Please detail the justification for the boundaries, and include references to data which were used for boundary delineation for each resource. If boundary delineation is based in part on professional or scientific judgement, please provide a summary of the several judgements. As new information becomes available from the several RI/FS activities, please explain and show how this information will be reviewed to determine if the several boundaries need adjustment, if review is contemplated.

Four bullets are shown under Section 7.1. For each bullet, explain whether new data will need to be collected, or whether existing data will be used, if both, please list the sources of past data with full references. Discuss how the data from the several RI/FS activities charted in the Clark Fork Superfund Master Plan Update will be coordinated with the Source Identification actions (for example the regional activities at the Anaconda site).

How will emissions from the Anaconda Smelter (or any other smelter) be confirmed? This facility has been closed and dismantled for some period of time. Will emissions from the Berkeley Pit need to be confirmed? If so, how will this confirmation be undertaken? This facility has also been closed for some period of time (that is, closed to mining). If the confirmation of emissions from air sources will include a review of past data; please cite the references for the data, including emissions inventories, the results of stack or air sampling (including aircraft sampling), materials and/or chemical mass balance studies, etc. Since this will include past data, please include in the appropriate section of the Plan how these data will be "evaluated" for useability. If new data will be collected, please explain how it will be used to confirm air emissions from the smelter.

Certain tailings deposits which have been implicated in acute fish kills in the upper Clark Fork River have recently been removed under ERA actions. Reference is specifically made to the tailings deposited in and along the Mill-Willow Bypass. How will releases from such tailings be confirmed, if they are to be confirmed? If past data will be accessed, please reference it and describe how it will be "evaluated" for useability in the appropriate section of the Plan.

7.2 Pathway Determination

It is stated that pathway determination will include the

demonstration that hazardous substances are present in "sufficient concentrations" in pathways, but no discussion is presented to show how concentrations found (if any) will be shown to be sufficient. It is recognized that such a showing may need to be made on a case-by-case basis, but the Plan should provide a discussion of how the demonstrations will generally be approached for the various media, including diagrams and graphics depicting the relationships among the several pathways and sources.

Certain of the showings may require modeling and possibly additional sampling in addition to the review of past data (air pathways are an example). The diagrams and charts should show how the several methods could be applied to the various pathways. If pathways have a priori concentrations which are sufficient concentrations, these should be identified (air concentrations, water concentrations, for example?).

Biological pathways are described, at least in part, under the sixth bullet on page 26. It is implied that the list presented is not inclusive. Please list other biota which will be considered as pathways. Do amphibians and reptiles qualify? If not, why not. Describe how the several biota could serve as pathways, and the source and target resources for the several pathways. A diagram or graphic would assist in conveying the intent of the Plan.

Vegetation is identified as a pathway under the sixth bullet on page 26. Please define what is meant by "vegetation" in the context of the sixth bullet. Does the definition include particular taxa, but include others? If so, why? Are certain plant parts or organs of particular interest as pathways?

Will the demonstration of presence in sufficient concentrations require the use of past data? if so, please reference these data in the appropriate section of the Plan. Explain how the several risk assessment activities attendant to ongoing and planned RI/FS actions will be useful to the pathway efforts contemplated by the Plan. Eventually, the lead agencies will need to take decisions about ecological risk, and the efforts and results of such risk assessments may be applicable to the NRDP, and vice versa.

7.3.3 Objectives of Research Plan

The plan states that the objectives of the surface water research plan include those objectives associated with the first four bullets on page 29. What are the other objectives of the surface water research plan?

Apparently control sites will be used for water quality comparisons to exposed areas. It would be helpful if an explanation of the use to which control site water quality data will be put, in light of the injury definitions shown under 7.3.1. For example, potability and suitability for aquatic life habitats may be inferred as pre-release conditions for exposed waters based on control site data.

Please explain how the time period during which injury has

occurred will be identified. This effort will certainly include the use, or consideration for use, of past data, which should be referenced and discussed in the appropriate section of the Plan.

Discuss how the past and future uses of surface water will be reviewed. What will be the purpose of the review? What data bases, literature or other sources will be consulted? How will the results of this review be used?, and who will use it?

7.3.4 Research Plan

It is not at all clear how control sites for water resources will or have been identified. Explain how this identification process will or has been conducted, and cite all of the criteria for control site selection. A decision tree and logic diagrams would help illustrate the process. Include the points at which previous data have been relied upon, and show where additional data may need to be collected.

Explain why the term "control" is used as opposed to "reference", or "baseline", or "comparison". The proposed research in the Plan for injury assessment to surface waters does not contemplate a controlled experiment(s), at least not on pages 29 and 30 of the Plan. A control implies exposure to the same stress or conditions as the experimental subject (or surface water resource) except for the variable(s) under experiment. Consideration should be given to the use of another term than "control", since the location of other water bodies meriting control status may be impossible. The acceptance of a reference area for comparison will largely be a judgmental decision anyway, no doubt, and perhaps subject to some debate.

7.4.3 Objectives of Research Plans

The same comments on control sites for surface water are pertinent to this section for field fisheries work for density, and habitat.

The reading of this Section 7.4 suggests that some research work has already been conducted. The Plan should contain, someplace, a schedule chart of activities showing actual work completed prior to the issuance of the plan. The prior work is problematic for commentors, because is unclear what QA/QC was applied to it, how past data was used, what past data was used, how the prior work was coordinated with RI/FS activities, what products were expected from the past work, what additional work needs to be undertaken as a result of the results of past work, etc. Consideration should be given to the issuance of an Assessment Plan for the past work described in the Plan. Any past work which has been conducted but is not described in the Plan should be included. At the least, the Plan should provide a time chart showing past work.

Were other Trustees notified of the past work prior to its completion? Were QA/QC plans prepared for the work? Were SAP's produced? What data validation procedures are to be applied?

When will the data be validated and available? Has any other work described in the Plan in the future tense already been started or completed? If so, which work, or which portions of the work?

7.6.4 Research Plan

This activity contemplates primary reliance on existing literature for the determination and quantification of injury to groundwater resources. If other sources than existing literature will be used or may be used, please identify them, along with the existing literature bases to be consulted. The comments above on the determination of the useability of past data apply here.

How will the Thompson Park and Blacktail Creek studies pertain to background or reference ground water quality for the groundwater between Butte and Missoula? Will additional work need to be completed?

How will the groundwater work contemplated in the Plan be coordinated with the several RI/FS groundwater activities underway or planned in the future at the various operable units?

Appendix A, Section 4.0

It is unclear if the DQO's arrayed in Table A-1 apply to existing data and/or to work already completed under the NRDp. If they are to be applied to past data, please describe how they will be applied in the useability determination process. If they are not to be applied, please show at the appropriate section of the Plan the DQO's that do apply to past data.

Second bullet, page A-5: What does "...justified in terms of complex matrices or by means of statistical review..." mean? How will the failure of measurement data to meet QC targets be attributed to a complex matrix? What use will be made of such data? What statistical review will data failing QC targets be subjected to? Could this include acceptance by tests for outliers? Which statistical tests will be included in the review? Measurement system bias could cause data to fail QC tests. How will such bias be identified?

It would be helpful if a chart or table of QC criteria failure and project objective useability could be included in the Plan. Absent this aid, it is unclear what role QC targets have for any of the data. They may be used, they may not be used, they may be justified based on unspecified statistical review, they may be used for certain unspecified purposes, but will be used for screening and presence/absence decisions. It is certainly imperative that the use to which data with no QC may be put be specified.

What does "little or no QC" mean????? Perhaps this could be clarified using somewhat more specific language. It would certainly be helpful to commentors.

The analytes Mo, Cl⁻ and SO₄²⁻ are shown on Table A-2 but not on Table A-1. Please provide the TAL's for these analytes. The

analytes Al, Ba, Tl and V are shown on Table A-1 but not on Table A-2. Please provide the DQO's for these analytes. The analytes Al, Ba, V, Tl, and TOC are not shown on Table A-3; please provide the appropriate data from Table A-3 for these analytes. The method of instrumental analysis for each analyte listed in Table A-1 and for sulfate, chloride and Mo should be identified in a table. Please modify Table A-4 to show QC criteria for all methods of instrumental analyses to be used. All media requiring a preparation method in addition to treatment identified in Table A-3 should have that method referenced. Please provide these references.

The following matrices are not shown on Table A-2: Fish, birds, other animals and ambient air. Please provide the information for these matrices on Table A-2, if appropriate, and include information on the other tables applicable to these matrices and the analytes of interest in them.

Please explain the purpose of analyzing TOC in tailings and sediments, but not in water matrices (Table A-2). Please explain why the DQO's on Table A-2 were selected. Are these for SRM's or for natural samples? If these DQO's were selected in whole or in part by literature, please cite it.

All requirements for metals in Table A-3 appear to apply to aqueous media; please provide the information from Table A-3 for metals including Al, Ba, Tl and V for all other matrices (fish, plants, animals, air samples).

5.0 Quality Control Procedures for Field Sampling and Measurements

It is stated on that the objective of field sampling and measurements is to obtain representative samples and measurements. It would be helpful if a discussion would be included describing how quality control for field work will in fact insure that samples collected are in fact representative of the media from which they were collected. Sampling design also strongly influences representativeness of samples. A discussion of how design applies to representativeness, and how the designs that have, are and will be applied to work described in the Plan influence representativeness.

It is stated that field variability is measured by field duplicate RPD's. This may be correct at least in part, depending on the definition intended for the phrase "field variability", which should be precisely and unambiguously defined in the Plan. Sampling precision is measured by coincident field duplicates taken with a minimum of spatial separation from the sample point, along with the other criteria identified in the first sentence on page A-14. Measurement system precision is measured by field splits, providing that the splitting process itself is unbiased, which is always an important consideration. Sampling precision itself cannot be measured by field splits, because the split does not provide information on the error component associated with the actual collection of the sample from which the (unbiased)

split was obtained.

If "field variability" = medium inhomogeneity, then it is measured by appropriate sampling design based upon some degree of a priori knowledge of the distribution of the analyte in the medium at issue. If "field variability" is not equivalent to medium inhomogeneity, then it should be defined, and the Plan should show how it is measured by the use of field duplicate RPD's.

7.0 Quality Control Procedures for Quality Control Samples

Consideration should be given to not using trip blanks for bottle blanks, and that bottle blanks always be determined on each lot. Sample bottles should NOT be taken to the field for sampling unless the lot has been shown empirically to be free of contamination from the analytes of interest. Bottle blanks are used here to include all types of sample containers (plastic sacks, etc.). Consideration should also be given to storing bottles used for bottle blank determination and one unopened bottle from each lot in archive, in the event that questions arise in the future about bottle contamination. The lot from which each bottle used for sampling originated should be recorded with other information for each sample (including QC samples).

Consideration should also be given to the use of field blanks, in addition to trip blanks. Field blanks are blanks which are treated in the same way that sample bottles are handled except that sample media are not placed into field blank bottles. Field blanks are opened at the time of sample collection, reagents are added as appropriate. Trip blanks will provide information about contamination resultant from transportation and associated handling, they are not opened in the field, but are treated as samples in the laboratory; field blanks can provide information about possible contamination from opening the sample bottle to collect the sample and other handling. These are important considerations when dealing with ug/L concentrations of analytes in samples collected in dusty and/or windy environments.

What procedures will be followed to determine background contamination (if any) in filter papers or Kimwipes used for cross-contamination blanks? How will the wiping material be transported and stored? What corrective action will be taken if contamination is detected in a field cross-contamination blank?

Requirements for minimal spatial separation between field duplicates and samples should be included in the definition of field duplicates.

Duplicate samples as defined do not provide measures of laboratory analytical bias. As discussed above, they provide a measure of the sampling component of error, or precision. Bias results when non-random, systematic error causes the sum of all error terms in the measurement system to not equal zero and thus effects accuracy. If a laboratory analytical system possess bias, the samples and duplicates subjected to that system will also be subjected to the bias in the system. Bias in a

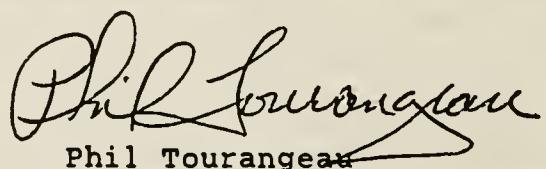
laboratory analytical system must be detected by the use of samples with known, or accepted "true" values. It cannot be detected by a sample whose true analyte concentration is unknown, as is the case for all field duplicate samples. It would be helpful for the QUAPjP to detail how field duplicates are to be used to provide a measure of laboratory analytical bias.

The heterogeneity of a sampling medium is not, in and of itself, a cause of bias in a laboratory analytical system. If the sampling design is biased, that is if samples are collected from the medium in areas which are restricted in terms of the distribution of analyte concentrations, then that design is biased, not the medium or the laboratory analytical system. Duplicates collected under such a design are themselves biased (in terms of the distribution of analyte concentrations in the medium). Medium anisotropy must be considered in sampling design before sampling is undertaken, and the anisotropy must be factored into the design. A laboratory analytical system essentially free of bias will produce an unbiased estimate of analyte concentrations in the samples it is challenged with irrespective of whether or not the sampling design is biased.

The Plan should detail how medium heterogeneity will be considered in sampling design for all media, and discuss steps to be taken to prevent sampling bias.

Again, thanks very much for the opportunity to comment. I look forward to discussing the above with you soon, if you have any questions. I would appreciate receiving copies of sampling and analysis plans and quality assurance project plans for the several studies presented in the Plan, including those for which work which has already been conducted.

I understand that you will be releasing Part II of the Plan this spring. Part II, as described in your January 27, 1992 notice, will contain much information. Perhaps you would consider an initial comment period somewhat longer than 30 days for Part II.



Phil Tourangeau

Phil Tourangeau



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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Ref: 8MO

February 26, 1992

Mr. Dick Peiersen
Natural Resource Damage Program Manager
Environmental Sciences Division
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ADMINISTRATIVE RECORD

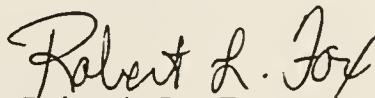
Dear Dick:

Thanks for the opportunity to comment on the "Assessment Plan, Part I, Clark Fork River Basin NPL Sites, Montana." EPA's comments are presented below.

1. Pages 7 and 9: EPA is particularly interested in obtaining data produced through the NRD assessment that could assist us in the conduct of RI/FS studies. Biological data at the Streamside Tailings operable unit and throughout the Clark Fork River would be very useful. Since we anticipate beginning scoping activities for a Clark Fork River RI/FS during the next year, fisheries data and other biological information would be particularly helpful. I hope we can work out a simple process for obtaining such data when it becomes available.
2. Page 43: There is no mention of assessing sediments in Milltown Reservoir. Do you intend to use the data already available through Superfund activities? There has also been some sediment work conducted below the dam. Does the NRD assessment consider areas below the dam? We also noticed there was no mention of assessing sediments in Warm Springs Creek, although the creek is identified as a source of hazardous substances (see page 12).

Again, thanks for the opportunity to review the plan.

Sincerely,


Robert L. Fox,
Clark Fork Coordinator

cc: Don Pizzini, 8MO
Susan Bostwick Nash, 8RC
Henry Elsen, 8RCMO

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March 16, 1992

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c/o Robert G. Collins, Attorney
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VIA TELEFAX

c/o Kevin M. Ward
Special Assistant Attorney General
Harding & Ogborn
1200-17th Street, Suite 1000
Denver, Colorado 80202

Re: State v. ARCO
Our File No. C-4498

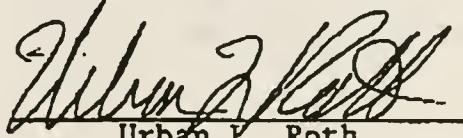
Dear Dick:

Enclosed please find a copy of Atlantic Richfield Company's Comments on the State of Montana's January 1992 "Assessment Plan: Part I, Clark Fork River Basin NPL Sites, Montana."

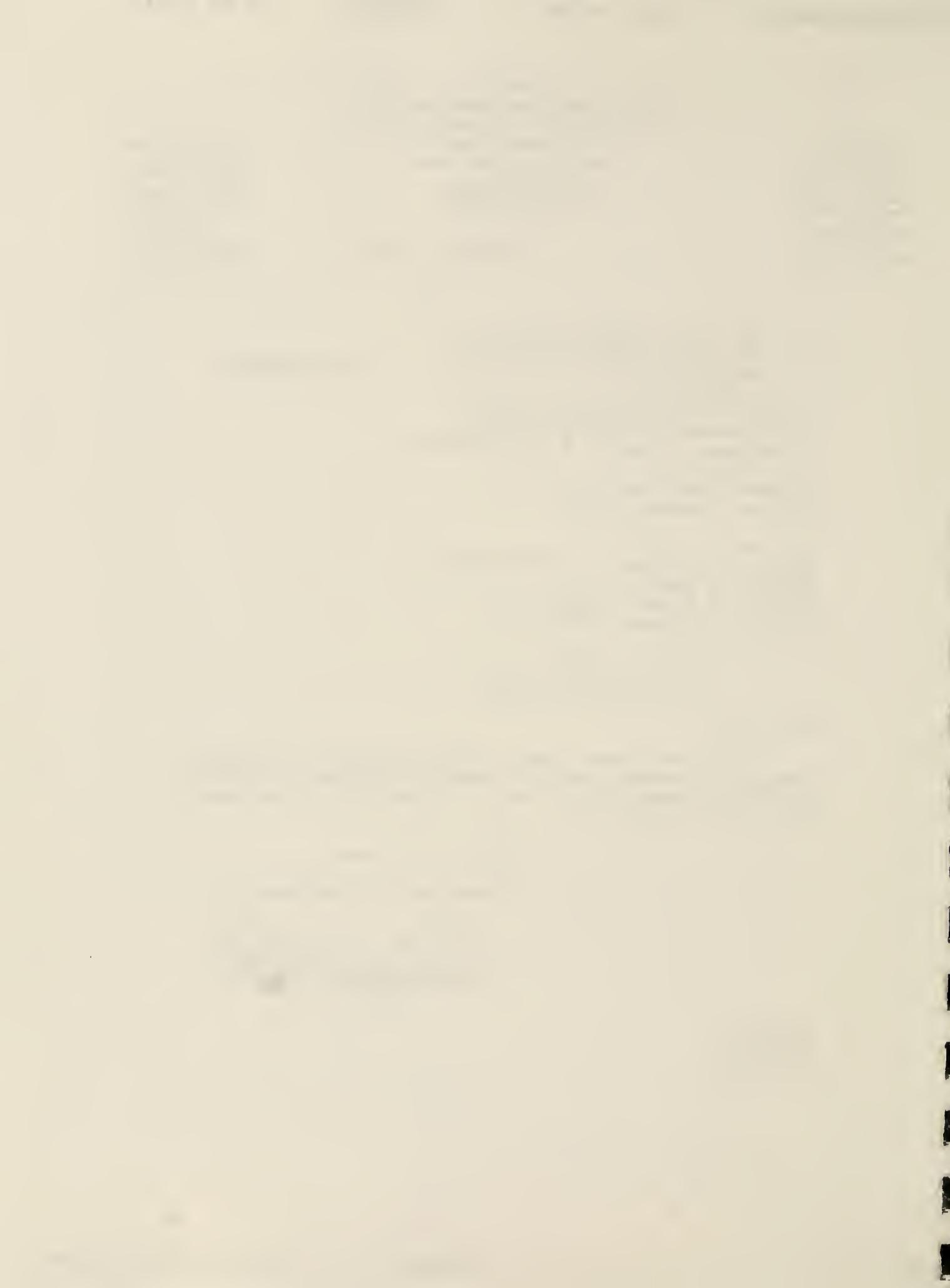
Very truly yours,

POORE, ROTH & ROBINSON, P.C.

By


Urban L. Roth

ULR/mla
0920316C
Enclosure



COMMENTS
OF ATLANTIC RICHFIELD COMPANY
ON THE STATE OF MONTANA'S
JANUARY 1992
"ASSESSMENT PLAN: PART I
CLARK FORK RIVER BASIN NPL SITES, MONTANA"

MARCH 16, 1992

SUBMITTED ON BEHALF OF
ATLANTIC RICHFIELD COMPANY
BY

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INTRODUCTION

The State of Montana has issued a 54-page document entitled "Assessment Plan: Part I Clark Fork River Basin NPL Sites, Montana" dated January 1992, which purports to meet the requirements of the Department of the Interior regulations, 43 C.F.R. Part 11, §§ 11.30-11.35. From the superficial and wholly conclusory tenor of this Assessment Plan (as well as the preceding Preassessment Screen), it is apparent that the State has predetermined that natural resources have been injured and that ARCO is responsible for this injury. The State makes no serious attempt to meet the regulatory requirements for an assessment plan. In material respects the Assessment Plan fails even to address regulatory requirements; for the balance, it merely parrots the regulations and concludes that it is in compliance. This cursory and superficial treatment of the Assessment Plan requirements demonstrates that the State views the Assessment Plan, as it did the Preassessment Screen, as merely a piece of paperwork that must be completed before it can attempt to collect damages.

The inadequacies of the Assessment Plan, Part I are comprehensive. The State fails to meet the general requirements for an assessment plan set forth in 43 C.F.R. § 11.30, the content requirements of Section 11.31 and the pre-development and development requirements of Section 11.32, fails to confirm exposure in accordance with Section 11.34, fails to develop research plans for the resources the Plan, Part I purports to treat that even begin to address in any substantive and satisfactory manner the elements of an assessment plan for a Type B assessment. Indeed, the inadequacies of the Plan are so funda-

mental and so pervasive that ARCO cannot in any meaningful way comment on the Plan, particularly its technical and scientific aspects.

Moreover, the numerous and material deficiencies of the Preassessment Screen have been carried forward into this phase of the assessment process. The inadequacies of the Preassessment Screen have become systemic, fatally compromising the State's ability to prepare an adequate Plan, and will ultimately render any subsequent assessment meaningless. As was plain from ARCO's comments on the Preassessment Screen, the State must withdraw and substantially revise and supplement the Preassessment Screen to correct its deficiencies before the State can proceed with an assessment plan.

The State has further compromised its Assessment Plan by bifurcating the Plan without any authority to do so and, in doing so, has plainly negated the purpose of an assessment plan -- ". . . to ensure that the assessment is performed in a planned and systematic manner and that methodologies selected . . . from Subpart E for a type B assessment . . . can be conducted at reasonable cost . . ." 43 C.F.R. § 11.30(b). Further, the State claims that Part I of the Assessment Plan "addresses activities associated with injury determination and quantification phases for four potentially injured natural resources: surface water resources, fisheries resources, sediment resources, and groundwater resources." (A.P. at ES-1). Part II of the Assessment Plan, the State discloses, will only address other resources and not the four which are the subject of Part I. (A.P. at ES-1). Hence, Part I's treatment of the four resources -- surface water, fisheries, sediment, and groundwater (the "Part I resources") -- is the only treatment the State intends to give those resources in

the Assessment Plan. That treatment is cursory and wholly inadequate under the regulations. Finally on this point, in impermissibly bifurcating its Assessment Plan, the State elects not now to identify certainly one of the most important aspects of an assessment plan -- the economic methodology it purportedly will select, as required by 43 C.F.R. §§ 11.31(c)(2), 11.35 -- and defers until some future "Part II" the critical subject of "methodologies for assessing economic damages." (A.P. at ES-1). Thus, the State is patently out of compliance with a central requirement of the regulations.

Finally, the gross and material inadequacies of the Assessment Plan, Part I, on top of the equally deficient Preassessment Screen, render this assessment process invalid and make the rebuttable presumption provided for in CERCLA § 107(f)(2)(C) unavailable to the State of Montana. The State has announced its intention to seek the rebuttable presumption afforded by CERCLA by pursuing a natural resource damage assessment in accordance with the U.S. Department of Interior regulations. However, to the extent the State purports to have followed those regulations, it has not been successful and, thus, is not entitled the presumption. Any claim that the State is so entitled is clearly unfounded.

I. LEGAL COMMENTS.

A. State Of Montana's Assessment Plan Does Not Comply With The Requirements Of The Regulations Regarding Natural Resource Damage Assessments Set Forth At 43 C.F.R. §§ 11.30-11.35.

1. State Has Failed To Develop An Assessment Plan That Ensures That The Assessment Will Be Performed In A Planned And Systematic Manner And That Methodologies Selected Can Be Conducted At Reasonable Cost.

Before initiating any assessment, the State must develop an Assessment Plan. 43 C.F.R. § 11.30(a). The purpose of this Assessment Plan is to "ensure that the assessment is performed in a planned and systematic manner and that methodologies selected . . . can be conducted at a reasonable cost" 43 C.F.R. § 11.30(b). Thus, the Assessment Plan is intended to provide a detailed blueprint of the actions that will be undertaken in the assessment. The State, however, has provided only general, almost generic, descriptions of some of its plans, has failed to address key aspects of the assessment, and has impermissibly postponed still other, important decisions until a later time. Moreover, the Assessment Plan is so incomplete and inadequate that it is impossible to determine whether the assessment can be completed in a cost-effective manner at reasonable cost.

a. Assessment Plan Fails To Identify And Document The Use Of All Scientific And Economic Methodologies That Are Expected To Be Performed.

Section 11.31 sets forth the required content of the Assessment Plan. Section 11.31(a)(1) provides that the Assessment Plan "shall identify and document the use of all of the scientific and economic methodologies that are expected to be performed during the Injury Determination, Quantification, and Damage Determination phases of the type B assessment . . ." 43 C.F.R. § 11.31(a)(1). The comments elaborate further:

All decisions on the selection of the methodologies, including, but not limited to, parameter values and other assumptions used to implement the methodologies provided in subparts D or E, must be documented. This documentation must be set out in the Assessment Plan.

51 F.R. 27678.

In short, the State's plans for its assessment must disclose precisely how it will go about the injury determination, quantification, and damage determination phases so that the merits of the plan may be evaluated in advance of any incurred costs. But instead of full disclosure of its plans as to Part I resources, the State's at best cursory and more often non-existent documentation of these decisions in its Assessment Plan makes a mockery of the regulations. Thus, the State has failed to abide by the regulations and must not proceed to the assessment.

(1) Plan Fails To Identify Economic Methodologies.

The Assessment Plan does not even discuss economic methodologies, let alone select one. The regulations are unequivocal on this point. In its preamble to the regulations, the Department of the Interior noted:

"The decision [concerning economic methodology] will affect the choice of methodologies to be selected in the Quantification phase and to a lesser extent in the Injury Determination phase. Therefore, the rule requires the decision at an early stage, but provides that the decision may be modified."

51 Fed. Reg. 27679 (August 1, 1986). (Emphasis added.) Section 11.31(c)(2) requires that the Assessment Plan incorporate the "Economic Methodology Determination performed in accordance with the guidance provided in § 11.35 of this part." Section 11.35(a) states that "the authorized official shall determine whether: restoration or replacement costs; or

a diminution of use values will form the basis of the measure of damages." (Emphasis Added) The State has failed to do so. While the decision in State of Ohio v. United States Department of the Interior, 880 F.2d 432 (D.C. Cir. 1989) struck down the "lesser of" guidance and some related aspects of the regulations, the regulations necessary to determining economic methodology remain, and the State is fully able to proceed.

The State's failure to make its methodology determination for assessing economic damages as required in 43 C.F.R. § 11.35 before publishing Part I of the Assessment Plan precludes evaluations of the selected methodologies for determining injury in accordance with 43 C.F.R. § 11.64(a)(3). That subsection requires that ". . . only those methodologies shall be selected . . . (iv) [t]hat will provide data consistent with the data requirements of the Quantification phase." The purpose of the Quantification phase, ". . . to quantify the effects of the discharge or release on the injured natural resource for use in determining the appropriate amount of compensation", 43 C.F.R. § 11.70(b), cannot be achieved if the Economic Methodology Determination leads to an alternative not supported by the results of the selected testing and sampling methods. And there is absolutely no way to realize this purpose if the State does not choose and identify the economic methodologies it intends to utilize in the assessment. Therefore, the failure to select and identify economic methodologies is a crucial omission and requires that the State

withdraw the Assessment Plan, Part I until such time as the Part II components are ready.

(2) Plan Fails To Identify Scientific Methodologies.

The State's entire treatment of injury determination and quantification for the Part I resources consists of a mere 23 pages, with obvious and enormous gaps in the areas it purports to cover. For example, the entire discussion of pathway determination is only one page and does not even mention, let alone choose the scientific methodologies by which it will determine exposure pathways. The section on "Source Identification" is, if possible, even scantier. Worse, in contrast to the "Pathway Determination" section, the "Source Identification" section does not even outline generically what the State "will" do but only what it thinks it "may" do to identify sources of hazardous substances. The separate sections on each of the Part I resources are terribly uneven, with extremely little planning for surface water resources and not much more for geologic and groundwater resources. The most consideration is given to fisheries, but only by contrast to the other sections. Standing alone, the fisheries section is still inadequate to meet the requirements for an assessment plan.

(a) Plan Fails To Identify Methodologies For Pathway Determination.

In its assessment the State must make determinations as to each suspected pathway or route through which the hazardous substance is or was transported from the source of the discharge

or release to the injured resource. 43 C.F.R. § 11.61(c)(3). Section 11.63 sets forth several basic considerations to determine the exposure pathways of the hazardous substance, and it also provides extensive guidance on the scientific methods for making the required determinations as to surface water, ground water, air, geologic, and biological pathways. The guidance is not optional. Under § 11.61(c)(3), "the authorized official shall follow the guidance provided in the pathway section, § 11.63 of this part, to determine" the exposure pathways. 43 C.F.R. § 11.61(c)(3). (Emphasis added.)

The State's Assessment Plan fails entirely to discuss the basic requirements for determining the exposure pathway, and it also fails to identify or document the scientific methodologies it will use in making its determinations.

The State lists all potential pathways generically as "relevant" to "potentially injured resources" without specifying either any particular pathway or any particular resource. The State also claims it will determine that the various generic pathways have been exposed to hazardous substances. (A.P. at 26-27). Not one word is said as to the basic requirements for the study of each suspected pathway, set forth in § 11.63(a) as follows:

"(a) General. (1) To determine the exposure pathways of the . . . hazardous substance, the following shall be considered:

(i) The chemical and physical characteristics of the . . . released hazardous substance when transported transported by natural processes or while natural natural present in natural media;

(ii) The rate or mechanism of transport by natural processes of the . . . released hazardous substance; and

(iii) Combinations of pathways that, when viewed together, may transport the . . . released hazardous substance to the resource."

43 C.F.R. § 11.63(a). (Emphasis added.)

Not only are the basic requirements ignored in the Assessment Plan, the Plan also overlooks the specific requirement for pathway identification that a resource suspected of serving as an exposure pathway be determined, in fact, to have served as an exposure pathway for injury to the resource. See, e.g., 43 C.F.R. § 11.63(b)(1).

Taking surface water pathway as one example of a suspected exposure pathway, the regulations provide guidance for the scientific determinations that must be made. But the State's Assessment Plan fails to identify whether or how it plans to comply with the guidance. For example, the State does not plan to estimate the "areal extent of the exposed surface water resource . . . including delineation of: (A) Channels and reaches; (B) Seasonal boundaries of open water bodies; and (C) Depth of exposed bed, bank, or shoreline sediments." 43 C.F.R. § 11.63(b)(3)(i). Nor does the State even suggest it will study or determine --

"(A) Hydraulic parameters and streamflow characteristics of channels and reaches;

(B) Bed sediment and suspended sediment characteristics, including grain size, grain mineralogy, and chemistry of grain surfaces;

(C) Volume, inflow-outflow rates, degree of stratification, bathymetry, and bottom sediment characteristics of surface water bodies;

(D) Suspended sediment concentrations and loads and bed forms and loads of streams . . ." --

as is called for by 43 C.F.R. § 11.63(b)(3). The State also ignores the additional suggestion in § 11.63(b)(4) that it use available information or, as necessary, data from additional tests to estimate the mobility of the hazardous substance in the exposed surface water resource. This mobility estimate, according to the regulations, should take into account the physical and chemical characteristics of the hazardous substance including its "aqueous solubility, aqueous miscibility, density, volatility, potential for chemical degradation, chemical precipitation, biological degradation, biological uptake, and adsorption." 43 C.F.R. § 11.63(b)(4)(i).

In addition to the mobility estimate, the regulations advise that the rate of transport of the hazardous substance in surface water "should be estimated using available information and with consideration of the hydraulic properties of the exposed resource and the physical and chemical characteristics of the . . . hazardous substance." 43 C.F.R. § 11.63(b)(5)(i). The regulations then identify four kinds of data or results of previous studies or field measurements that may be used to estimate transport rates. 43 C.F.R. § 11.63(b)(5)(2).

Thus, examining the regulatory requirements for just one category of potential exposure pathway -- surface water -- it is clear that the State has given no consideration to the

determinations it must make, including the scientific methodologies by which it will make them.

Extensive guidance is similarly provided in the regulations for determinations as to the potential groundwater pathway (43 C.F.R. § 11.63 (c)(1)-(5), air pathway (43 C.F.R. § 11.63(d)(1)-(5)), geologic pathway (43 C.F.R. § 11.63(c)(1)-(2)), and biological pathway (43 C.F.R. § 11.63(f)(1)-(6)). And similarly, though the State baldly asserts each of these as "relevant" pathways, the Assessment Plan, Part I does not purport to follow any of the guidance or advise as to the methodologies by which it will comply with the regulatory requirements.

(b) Plan Fails To Define And List Objectives for Testing And Sampling.

Under § 11.64(a)(2):

"Before selecting methodologies, the objectives to be achieved by testing and sampling shall be defined. These objectives shall be listed in the Assessment Plan."

43 C.F.R. § 11.64(a)(2). The State's Assessment Plan does contain a short (less than one-half page) section entitled "Objectives of Research Plan" for each of the Part I resources. The State's listed "objectives" do not satisfy the regulation, however, because (1) they are not objectives of any testing and sampling plans, and (2) they do not take into consideration the matters listed in § 11.64(a)(2). Section 11.64(a)(2) states, in part:

"In developing these objectives, the availability of information from response actions relating to the

discharge or release, the resource exposed, the characteristics of the . . . hazardous substance, potential physical, chemical, or biological reactions initiated by the discharge or release, the potential injury, the pathway of exposure, and the potential for injury resulting from that pathway should be considered."

43 C.F.R. § 11.64(a)(2).

The State's objectives, by contrast, do not take into account any such specific information. Instead, they consist of hopelessly vague aspirations such as "[q]uantify baseline concentrations of hazardous substances," (A.P. at 47). The State's failure to comply with the express mandate of § 11.64(a)(2) must be corrected before the State may proceed with an assessment.

(c) Plan Fails To Identify Methodologies For Injury Determination Phase.

The regulatory requirements for the injury determination phase are set forth in §§ 11.61 - 11.64, most of which are completely ignored by the State in its cursory treatment of injury determination for the Part I resources. Under § 11.31(a)(1), the State is required in its Assessment Plan to "identify and document the use of all the scientific methodologies that are expected to be performed during the Injury Determination [phase]." 43 C.F.R. § 11.31(a)(1). The State has failed to comply with this requirement.

By far the most ill-considered section is the first addressing surface water resources. Less than three pages, with extremely little information to be found on any of them, this

section has almost nothing to do with the State of Montana, let alone any particular surface water resources therein.

The State identifies not one scientific methodology it expects to perform with respect to surface water resources. Aside from noting generally that existing data from the RI/FS process, Montana DHES long-term ambient monitoring, and "related studies" will be used, the State gives no indication of any specific plans to determine injury to surface water resources. Indeed, in a general way it discusses steps it "may" take, such as "[q]uantify baseline concentrations of hazardous substances at control sites . . ." (A.P. at 29.) In fact, that step is mandatory. The State's Assessment Plan must set forth how it plans to accomplish the step rather than speculate whether it will agree to do so.

The State has similarly failed to identify methodologies for injury determination for fisheries, sediments and groundwater resources.

(d) Plan Fails To Identify
Methodologies For Quantification
Phase.

The regulatory requirements for the quantification phase of an assessment are set forth in §§ 11.70 - 11.73. These are almost entirely left out of the State's purported planning for three out of the four Part I resources.

Whereas the "Injury Quantification" section on surface water resources amounts to a single sentence, no such section appears at all for either geologic or ground water resources. It can only be concluded that the State plans no quantification

phase for geologic or ground water resources. In that event, it is a worthless exercise to consider incurring costs for any injury determination as to those resources.

The single sentence the State offers on injury quantification for surface water resources is an inaccurate restatement of the general requirement of § 11.71(h)(1). Nothing is said of the scientific methodology by which the necessary determinations will be made. Thus, the State's Assessment Plan for surface water resources is incomplete and unacceptable.

(e) Plan Fails To Specify Details of Standard Operating Procedures.

Throughout this section and in others, various standard operating procedures (SOPs) are cited as containing pertinent details of procedures to be conducted and methods to assure quality of the results of proposed studies. Section § 11.31(a)(2) of 43 C.F.R. states, "The Assessment Plan shall include the sampling locations . . . , sample and survey design, numbers and types of samples to be collected, analysis to be performed [emphasis added] . . . and other such information required to perform the selected methodologies" [[emphasis added]. These SOPs describe the analyses to be performed and represent "information required to perform the selected methodologies." This information should be included in the Assessment Plan and distributed with it for review and comment by the public in accordance with 43 C.F.R. § 11.32(c).

b. State's Division Of Assessment Plan Into Two Parts Is Unauthorized And Unconstructive.

The State has divided the Assessment Plan into two parts without any authority to do so. According to the State, Part I "addresses activities associated with injury determination and quantification phases for four potentially injured natural resources: surface water resources, fisheries resources, sediment resources, and groundwater resources." (A.P. at 5) The State promises that Part II will be available in the spring of 1992 and "will contain methodologies for conducting injury determination and quantification for soil resources, vegetation resources, wildlife resources and air resources" Id.

This piecemeal approach to preparation of the Assessment Plan is hardly conducive to assuring that the assessment is performed in a planned and systematic manner. Rather, the result is a disjointed product which asserts that certain steps will be taken in Part II, but which provides no assurances that those steps will be complementary and supplementary of Part I and will produce an integrated Assessment Plan rather than simply a bootstrap from one materially inadequate document to another, that duplicative efforts will be avoided either in the preparation of the Assessment Plan or during the assessment itself, or that all the necessary steps have been taken.

It will be difficult, if not impossible, to work with this confused, fragmented product. The State's approach to the Assessment Plan reaffirms that the State is preparing the Assessment Plan to create the appearance that it has met regulatory requirements, not to assure that the assessment is

carried out in an organized and cost-effective manner as required by the regulations.

c. Plan Fails To Address Or Demonstrate That The State Has Chosen A Method For Assessing Damage That Is Likely To Be Cost-Effective And Meets The Definition of Reasonable Costs.

Not only does the Assessment Plan fail to provide a planned and systematic approach for the assessment, it fails to discuss whether the approach used for assessing the damage is "likely to be cost-effective and meets the definition of reasonable costs." 43 C.F.R. § 11.31. In fact, the Assessment Plan does not even acknowledge this requirement. Moreover, the Assessment Plan fails to provide information sufficient to determine whether the State has chosen a method for assessing damage that is likely to be cost-effective and meets the definition of reasonable costs. Costs are reasonable:

"[W]hen: the Injury Determination, Quantification, and Damage Determination phases have a well-defined relationship to one another and are coordinated; the anticipated increment of extra benefits in terms of the precision or accuracy of estimates obtained by using a more costly injury, quantification, or damage determination methodology are greater than the anticipated increment of extra costs of that methodology; and the anticipated cost of the assessment is expected to be less than the anticipated damage amount determined in the Injury, Quantification, and Damage Determination phases."

43 C.F.R. § 11.14(ee). Bisecting the Assessment Plan into two parts virtually guarantees that achieving a "well-defined" and "coordinated" relationship among the Injury Determination, Quantification and Damage Determination Phases is virtually impossible.

The regulations describe the type of information necessary to evaluate cost-effectiveness or reasonableness. Section 11.31(a)(2) provides that the Assessment Plan "shall be of sufficient detail to serve as a means of evaluating whether the approach used for assessing the damage is likely to be cost-effective and meets the definition of reasonable costs" 43 C.F.R. § 11.31(a)(2). The regulations elaborate further as to the level of detail that is required to make this determination:

The Assessment Plan shall include descriptions of the natural resources and the geographical areas involved. In addition, for Type B assessments, the Assessment Plan shall include the sampling locations within those geographical areas, sample and survey design, numbers and types of samples to be collected, analyses to be performed, preliminary determination of the recovery period, and other such information required to perform the selected methodologies.

Id. None of this information is contained in the State's Assessment Plan. Instead, as discussed in section A.1.a., supra, the State's Assessment Plan merely contains general, almost generic, descriptions of the steps it plans to perform.

The "Research Plans" (section 7.0) do not provide information with respect to: [1] specific assessment or "control" sampling locations identified on maps or in text provided, [2] specific listings of the numbers and types of samples to be collected, or [3] analyses of the resultant data described. The requirements of 43 C.F.R. § 11.71(c)(1)-(6) cannot be met without such fundamental information. This information is also prerequisite to meeting the Quality

Assurance requirements set forth in 43 C.F.R. § 11.63(f)(5) and (6). The Assessment Plan should be revised to include this specific and significant information.

Moreover, Section 7.4.4 identifies several studies that have been initiated prior to completion of the public review process required in 43 C.F.R. § 11.32(c)(1) of those regulations. Much of this research may be found to be irrelevant in view of the comments submitted in the public review process, resulting in the State failing to satisfy the cost-effectiveness requirements of 43 C.F.R. § 11.30(c)(2) and § 11.60(d)(2).

2. State Has Failed To Develop An Assessment Plan That Contains Information Sufficient To Demonstrate That The Damage Assessment Has Been Coordinated With Any Remedial Investigation Feasibility Study Or Other Investigation Performed Pursuant To The NCP.

The regulations also require that the Assessment Plan "contain information sufficient to demonstrate that the damage assessment has been coordinated to the extent possible with any remedial investigation feasibility study or other investigation performed pursuant to the NCP." 43 C.F.R. § 11.31(a)(3). Coordination helps avoid duplicative efforts and promotes cost-effectiveness. The State's Assessment Plan fails to demonstrate that the damage assessment has been coordinated in any way with the remedial investigation feasibility study. The Assessment Plan merely states that "data, information and reports prepared as part of the Superfund process have been provided to the Natural Resource Damage Program." (A.P. at 7) This statement does not demonstrate coordination. It merely

indicates that the State has received certain information. The Assessment Plan is completely devoid of any discussion as to how, if at all, this information was used. There is no assurance that efforts are not being duplicated, that the results of the RI/FS have been considered, or that these reports have even been read.

B. State's Assessment Plan Continues And Makes Systemic The Deficiencies Of The Preassessment Screen.

1. State's Failure To Make Required Determinations In The Preassessment Screen Renders Confirmation of Exposure Meaningless.

Section 11.34 provides that "the authorized official shall confirm that at least one of the natural resources identified as potentially injured in the preassessment screen has in fact been exposed to the oil or hazardous substance." 43 C.F.R. § 11.34(a)(1) This determination is dependant on whether the State, in the first instance, properly identified those natural resources as being potentially injured by a hazardous substance in the Preassessment Screen. The State's failure in the Preassessment Screen to adequately make preliminary determinations regarding identification of natural resources, the release of hazardous substances, injury or potential injury, and the ability of response actions to remedy the claimed injury has created a systemic defect which continues to plague the process. Without these determinations, any attempt to confirm exposure is meaningless. In fact, the State, by including plans to identify "sources of hazardous substances to which natural resources have been exposed . . .," in the Assessment Plan

confirms that the information presented in Sections 5.0 and 6.0 are inadequate for that purpose.

a. State's Failure In The Preassessment Screen To Make The Required Preliminary Determination As To Injury Or Potential Injury To Natural Resources renders Confirmation Of Exposure Meaningless.

The State failed to make the required preliminary determination in the Preassessment Screen as to injury or potential injury to natural resources. Before proceeding with an assessment, the trustee must demonstrate that "[t]he quantity and concentration of the discharged oil or released hazardous substance is sufficient to potentially cause injury . . . to those natural resources." 43 C.F.R. § 11.23(e)(3). The trustee's failure to demonstrate injury is fatal. The Department of the Interior's comments on this subject are unequivocal:

To assert a natural resource damage claim, the authorized official must establish that an injury occurred and must link that injury to the discharge or release. Otherwise, no further assessment actions are to be taken and no assessment costs will be recovered.

51 Fed. Reg. 27679.

As directed by the regulation, in making its injury determination, the trustee must look to the definition of injury as that term is used in the regulations. The regulations require the trustee "to determine that an injury has occurred to natural resources based on the definitions provided in this section . . ." 43 C.F.R. § 11.62. The regulations enumerate the conditions that the trustee must show with respect to specific resources in order to determine that those resources

have been injured. The regulations provide definitions for surface water, ground water, air, biological and geologic resources. As discussed in detail in ARCO's comments on the Preassessment Screen, the State has failed to demonstrate adequately that any of those resources have been injured.

The State's discussion in the Assessment Plan of alleged exposures to various resources does not cure this deficiency. The Assessment Plan, for the most part, merely regurgitates the information contained in the Preassessment Screen. It does not demonstrate that any resource has been injured.

The State must determine that a natural resource has been injured before it can move on to the confirmation of exposure step. The State's assertion in the Assessment Plan that certain resources have been exposed to hazardous substances is meaningless given that the State has failed to demonstrate that those resources were injured. The State has created a systemic problem which can only be remedied by fulfilling the requirements of the Preassessment Screen with respect to injury. The State is building a house of cards on a shaky foundation that collapses under its own weight.

b. State's Failure In The Preassessment Screen To Make Required Preliminary Determinations As To Current Response Actions Or The Inability Of Those Response Actions To Remedy The Claimed Injury Renders Confirmation Of Exposure Meaningless.

The State has also failed to make the required preliminary determination in the Preassessment Screen that "[r]esponse actions, if any, carried out or planned do not or will not

sufficiently remedy the injury to natural resources without further action." 43 C.F.R. §11.23(e)(5).

The State does not even identify a single response action carried out or planned, much less determine that response actions will not sufficiently remedy the claimed (but unidentified) injury. The Assessment Plan does not provide any further clarification. The Assessment Plan merely states that the Natural Resource Damage Program has "communicat[ed] with federal and state project managers for the various operable units" and that "[d]ata, information and reports prepared as part of the Superfund process have been provided to the Natural Resource Damage Program." (A.P. at 5) Without this information it is impossible to determine whether any injury remains. This prefatory determination must be made before exposure can be confirmed.

c. State's Failure In Preassessment Screen To Make The Required Preliminary Determinations Regarding Release Of Hazardous Substances Renders Confirmation Of Exposure Meaningless.

Confirmation of exposure is also dependent on preliminary determinations being made in the Preassessment Screen regarding the release of hazardous substances. The State's Preassessment Screen, however, does not make the preliminary determinations regarding the occurrence of a release of a hazardous substance (43 C.F.R. § 11.23(e)(1)), time, quantity, duration, and frequency of the discharge or release (43 C.F.R. § 11.24(a)(1)), or the hazardous nature of the described releases (43 C.F.R. § 11.25(a)(2)). The Preassessment Screen simply lists 13

hazardous substances which it says have been ". . . identified thus far as having been released . . ." from locations within the Clark Fork River Basin area but fails to state from what, if any, facility any of the substances was released.

The regulations also require that the trustee determine the time, quantity, duration and frequency of the release or releases in question. 43 C.F.R. § 11.24(a)(1). Nowhere in the Preassessment Screen does the State make even a pass at attempting to satisfy this requirement.

The State makes the general and unsupported assumption that mine waste substances are "hazardous substances" and that the State may recover for damage to natural resources allegedly caused by release of such substances. The State has failed to examine this issue in light of the applicable law, therefore it has failed to make the required preliminary determination under 43 C.F.R. §11.23(e)(1) that a "release of a hazardous substance has occurred." (Emphasis added.)

Mine wastes "from the extraction, beneficiation and processing of ores and minerals" are not hazardous substances under CERCLA. CERCLA § 101(14), 42 U.S.C. § 9601(14), which defines hazardous substances, specifically exempts "any waste, the regulation of which under the Solid Waste Disposal Act has been suspended by Act of Congress." Regulation of "[s]olid waste from the extraction, beneficiation and processing of ores and minerals, . . ." had been suspended by Act of Congress in § 3001(b)(3)(A)(ii), 42 U.S.C. § 6921(b)(3)(A)(ii), of the Solid Waste Disposal Act, prior to the enactment of CERCLA.

Therefore, the State cannot recover for the damages it claims as a result of the release of mine waste substances, which are not "hazardous" under the statutory definition. Confirmation of exposure to substances that the State has failed to demonstrate are hazardous is meaningless.

The Assessment Plan does not correct these deficiencies. The Assessment Plan again merely lists several hazardous substances which the State claims have been released. In an apparent attempt to identify the locations of these releases, the State lists several areas that are alleged to contain various amounts of "waste material." This description is not sufficient to overcome the deficiencies of the Preassessment Screen. The State's description does not identify which substances are allegedly contained in these "wastes" or whether there has been a release. Moreover, the State has failed to provide information regarding time, quantity, duration and frequency of the discharge or release as required by the regulations. Finally, the State has failed to acknowledge that mine wastes are not hazardous substances under CERCLA.

The State implies that all wastes within the NPL sites containing listed constituents are hazardous substances by virtue of their toxicity (Montana NRD 1991). However, they have not demonstrated the toxic properties of these wastes. In the RCRA Final Rule released on January 2, 1992, the EPA has formally articulated a policy that the mere presence of a listed constituent (e.g., arsenic, cadmium, or lead) does not make a waste hazardous. Instead, a substance is hazardous only after

"the [EPA] administrator [has] determine[d] that the waste [containing an Appendix VIII listed constituent] is capable of posing substantial harm if managed improperly" (BNA 1992; Environmental Reporter 1-10-92, p. 2116). The EPA requires use of the TCLP extraction to determine whether wastes are toxic under RCRA (and, by reference, CERCLA). All metals concentrations reported in Section 6.0 for the wastes referred to in this section are presented as total concentrations rather than TCPL concentrations. Nowhere in this document does the State explicitly refer to other than total concentrations of metals.

- d. State's Failure In Preassessment Screen To Make The Required Preliminary Determination And Identification Of The Natural Resources Which Have Been Or Are Likely To Have Been Adversely Affected By Releases Renders Confirmation Of Exposure Meaningless.

The State must also confirm in the Assessment Plan that natural resources identified as potentially injured have been exposed. 43 C.F.R. § 11.34(a)(1) The State, however, has failed to make the required preliminary determination and identification of the natural resources which have been or are likely to have been adversely affected by releases. The State's attempt to confirm exposure to natural resources that have not been properly identified provides yet another example of the systemic defects caused by the State's failure to perform an adequate Preassessment Screen.

The State's Preassessment Screen does not make the required determination that any natural resource for which the State may

assert trusteeship under CERCLA has been or is likely to have been adversely affected by release of a hazardous substance, nor does the Preassessment Screen identify, as is also required, any natural resource for which the State is trustee which is potentially affected by the alleged release of a hazardous substance. See 43 C.F.R. §§ 11.23(e)(2) and 11.25(e)(1) and (2).

The State, in the Preassessment Screen, purports to address pathways by which natural resources might be affected, describes only very generally and completely inadequately surface waters, groundwaters, sediments, riparian vegetation, certain biological samples and then simply lists ten categories of natural resources with no effort at specific identification except as to only three. As to the three, the State has under "surface water" included the Clark Fork River, Silver Bow Creek, Warm Springs Creek, Willow Creek, and Warm Springs Ponds; under "groundwater," the State has included ". . . aquifers underlying Butte, Anaconda and Milltown;" under "Riparian Wetlands," the State has included Warm Springs Ponds. The State has only generically described services of those resources affected or potentially affected. For example, the State lists water for "drinking and other domestic uses," and ". . . for irrigation of crops and livestock," "... contact recreation, including swimming, boating and other activities," and ". . . air for breathing, visibility and aesthetics."

These virtually completely general, if not generic, descriptions of resources and related services simply do not satisfy the requirements of 43 C.F.R. §§ 11.23(e) and

11.25(e)(1) and (2). As has been noted, the point of the preassessment screen review is to determine whether there is a sufficient basis to go on to assessment of injury and quantification of damages process. Thus, in order to meet the requirements of the regulations as they fulfill the purpose of the Preassessment Screen, the State must specifically determine and identify the natural resources and related services which have been or might have been injured by the release of a hazardous substance and the resources and services must be tied to or identified with a particular release which itself must be sufficiently identified in terms of time, duration, cessation and other circumstances so that it may be determined whether the release or releases in question occurred prior to the enactment date of CERCLA (December 11, 1980), occurred as part of an irreversible and irretrievable commitment of resources and/or constitute a permitted release or were naturally occurring, so as to be exempt from liability under CERCLA and the regulations. No such link is even attempted in the Preassessment Screen.

Moreover, under the regulations, in its Preassessment Screen, the State must make a preliminary determination that:

[n]atural resources for which the federal or state agency may assert trusteeship under CERCLA have been or are likely to have been adversely affected by the discharge or release.

43 C.F.R. § 11.23(e)(2). The State has not complied with this regulation. The State has ignored this key element of its case in failing to identify the natural resources and their

geographical locations for which the State claims a trustee relationship. Without such identification, the State cannot maintain its action for damage to those natural resources, and therefore it cannot justify proceeding with an assessment.

By failing to identify the natural resources that have been potentially injured, the State cannot confirm whether those natural resources have in fact been exposed to oil or a hazardous substance.

The Assessment Plan makes no attempt to correct these deficiencies. Although the Assessment Plan purports to address activities associated with injury determination and quantification of the Part I resources, the Plan does not provide any additional detail sufficient to enable the State to conclude that the State may assert trusteeship over those resources or that those resources have been adversely affected by a release of a hazardous substance.

C. State's Assessment Plan Fails To Provide Any Reasonable Procedure Or Any Schedule For The Sharing Of Data, Split Samples And The Results Of Analyses.

The State of Montana has failed completely to satisfy the requirements of 43 C.F.R. § 11.31(a)(4) which provides that:

The Assessment Plan shall contain procedures and schedules for sharing data, split samples and results of analyses, when requested, with any identified potentially responsible parties and other natural resource trustees.

(Emphasis added.) Indeed, the State's attitude and approach toward any meaningful compliance with the U.S. Department of Interior regulations relating to the assessment process are reflected in its minimal and wholly inadequate response to this

requirement in Section 3.0 of the Plan. Also in plain violation of the regulations is the fact disclosed in the Assessment Plan, Part I that the State engaged in sampling and analyses as part of the assessment process without notice to ARCO and before issuing the Plan.

The regulation plainly requires that the State share data and results of analyses with ARCO and provide split samples to ARCO. However, Section 3.0 of the Plan begins with a mischaracterization of the regulation, stating that the assessment plan "may include" the procedures and schedules identified in 43 C.F.R. § 11.31(a)(4), whereas the regulation expressly states that the assessment plan "shall contain" those procedures and schedules. Then, Section 3.1 entitled "Procedures And Schedules For Sharing Data and Results of Analyses", does not, contrary to its title and the regulation requirement, set forth any such procedure or schedule; rather, State attempts to place the onus of submitting a written request for data, split samples and results of analyses on ARCO. Moreover, Section 3.1 is improperly limited to "valid" data from "individual studies" and does not even mention analyses. The Assessment Plan is required to contain procedures and schedules for sharing all data and analyses, and is deficient in its failure to do so.

Section 3.2, entitled "Procedures and Schedules For Split Samples", is similarly incomplete and deficient. Although 43 C.F.R. § 11.31(a)(4) refers without limitation to "split samples", Section 3.2 of the Plan is limited to "field sample collection". Further, Section 3.2 states that ARCO will be

provided with an opportunity to collect "appropriate duplicate samples", again ignoring the explicit language of the regulation and apparently attempting to limit ARCO's access. Under the regulations, the Assessment Plan must contain schedules and procedures for providing ARCO with splits of all samples, not just duplicate samples, and ARCO must be afforded the opportunity to determine what split or duplicate samples are appropriate.

Further, sections 3.1 and 3.2 contain no schedules and inadequate procedures for sharing data, split samples and results of analyses. The Assessment Plan must contain schedules and adequate procedures for sharing such information under 43 C.F.R. § 11.31(a)(4).

Moreover, the sampling and other field exercises, analyses, conclusions and determinations which the Assessment Plan, Part I reveals the State has already and without notice to ARCO undertaken relating to biologic resources (specifically fisheries), geologic resources (specifically sediments) and any similar sampling and/or analyses relating to any other type of resource done before issuance of the Assessment Plan and without notice to ARCO violate the letter and spirit of the DOI regulations, 43 C.F.R. §§ 11.30 et seq. Further, to the extent the State commences any other sampling, field exercises, analyses or related activity in connection with its natural resource damage assessment for the Clark Fork River Basin NPL Sites without notice to ARCO consistent with the request set

forth in this letter, any such activity will also violate the DOI regulations.

The DOI regulations are unequivocal in their mandate that a potentially responsible party be offered the opportunity to participate in the assessment process (see 51 Red. Reg. 27678 (August 1, 1986)) and equally clear that no step in the assessment process is to be initiated until an assessment plan is prepared and issued (see id. at 27682). Accordingly, the regulations require the trustees, here the State of Montana, to include in the assessment plan ". . . procedures and schedules for sharing data, split samples, and results of analyses, when requested, with any identified potentially responsible parties . . ." 43 C.F.R. § 11.31(a)(4). (Emphasis added.) And the regulations further provide that the Assessment Plan ". . . shall be . . . available for review . . . for a period of at least 30 calendar days . . . before the performance of any methodologies contained therein." 43 C.F.R. § 11.32(c)(1). (Emphasis added.) That provision plainly contemplates that such procedures and schedules will be developed to apply to any sampling events, analyses and similar activities so that a PRP may meaningfully participate in the assessment process.

The Assessment Plan, Part I discloses that the State, without any notice or opportunity to ARCO as required by Section 11.31(a)(4) of the regulations, engaged in significant sampling with respect to biologic, geologic and possibly other natural resources before issuance of the Assessment Plan, Part I. These activities constitute clear and particularly material violations

of particularly significant mandates of the regulations. This impermissible conduct effectively negates any validity the Assessment Plan, Part I might otherwise have had.

D. State's Assessment Plan Does Not Comply With The Requirements Of The Regulations Concerning Identifying And Involving All Potentially Responsible Parties.

In flagrant violation of the Department of Interior regulations, 43 C.F.R., § 11.32(a)(2), the State of Montana has failed to make any effort to identify and involve in the assessment process a number of parties, other than ARCO, whose activities in the Clark Fork River Basin NPL Sites area are well known to the State. Rather, the State, impermissibly and unfairly, has identified and involved only ARCO in the natural resource injury and damages assessment process. This deficiency alone materially compromises the State's assessment process and the Plan even if the process and Plan were otherwise sufficient. In addition, this deficiency constitutes just another reason why the State is absolutely not entitled to a rebuttable presumption with respect to the adequacy of the Plan.

Section 11.32(a) addresses "pre-development requirements" and provides "[t]he authorized official shall fulfill the following requirements before developing an Assessment Plan." (Emphasis added.) The second of those requirements is set forth in 43 C.F.R. § 11.32(a)(2) entitled "identification and involvement of the potentially responsible party" and provides as follows:

(2) Identification and involvement of the potentially responsible party: (i) If the lead agency

under the NCP for response actions at the site has not identified potentially responsible parties, the authorized officer shall make reasonable efforts to identify any potentially responsible parties. (ii) In the event the number of potentially responsible parties is large or if some of the potentially responsible parties cannot be located, the authorized official may proceed against any one or more of the parties identified. The authorized official should use reasonable efforts to proceed against most known potentially responsible parties or at least against all those potentially responsible parties responsible for significant portions of the potential injury.

Nowhere in the Assessment Plan, Part I does the State address its obligation to ". . . use reasonable efforts to proceed against most known potentially responsible parties . ." (43 C.F.R. § 11.32(a)(2)(ii)), nor does the State anywhere in the Plan mention a potentially responsible party other than ARCO. Moreover, the State's description in the Plan of what will be included in the Assessment Plan, Part II does not mention the identification of any other potentially responsible parties. Finally, the State's default on this requirement is not just that it failed to identify potentially responsible parties other than ARCO in the Plan; the requirement is to fulfill the obligation of identifying and involving potentially responsible parties ". . . before developing an Assessment Plan." 43 C.F.R., § 11.32(a). (Emphasis added.) Indeed, the whole scheme for assessment of natural resource injury and damages as reflected in the Department of Interior regulations is to identify all potentially responsible parties ("PRP") as early as possible in the process, and explicitly before an assessment plan is developed. A trustee must involve such PRPs in the assessment process in order to put all potentially liable

parties on notice of the process as well as to insure that the requirements of the regulations are substantially and meaningfully fulfilled and the most reasonable, appropriate and cost effective assessment is achieved. See 51 Fed. Reg. 27678, 27682 (August 1, 1986); 43 C.F.R. § 11.32. As with its pre-assessment screen and other aspects of this Assessment Plan, Part I, the State has not made even the slightest effort to identify and involve potentially responsible parties other than ARCO although such other PRPs are well known to the State.

Such other PRPs would include, for example, five persons who have been involved with the operations and activities of Montana Resources in the area of the Berkeley Pit (part of the Silver Bow Creek/Butte Area NPL Site) and whose identities are known to the State of Montana and, also, the United States of America which has owner liability with respect to much of the area of the Clark Fork River Basin NPL Sites.

The Montana Resources group includes Dennis R. Washington, Montana Resources, Inc., Asarco, Inc., AR Montana Corporation and Montana Resources, a partnership. These entities own significant portions of land within the NPL Sites and, in addition, since 1986, Washington, MRI and their successors have been engaged in and responsible for mining and related operations on some of their lands. Montana Resources has been importing into the drainage approximately 5.5 millions of gallons of water every working day, much of which is making its way into the Berkeley Pit as the lowest point in the hydraulic system. At the same time, 1.5 millions of gallons of water a

day flow to the Berkeley Pit from completely controllable surface water sources originating on Montana Resources property. These activities are causing an average of 1.5 million gallons of untreated, contaminated surface water, containing substantial quantities of heavy metals, to be discharged into the Berkeley Pit with the result that the rate of increase in the level of water in the Berkeley Pit is significantly accelerated. Indeed, the Assessment Plan, Part I identifies this impact on groundwater resources --

Water samples taken in the Berkeley Pit -- which is filling with groundwater from the Butte aquifer -- have shown extremely elevated concentrations of arsenic (1,380 ppb), cadmium (1,860 ppb), copper (213,000 ppb), lead (576 ppb), and zinc (505,000 ppb) (Camp Dresser & McKee 1988, in Johnson and Schmidt 1988). Further evidence of widespread contamination in the Butte Hill area is illustrated by groundwater obtained from the Travona Mine in January and February 1989: groundwater had mean concentrations of 177 ppb arsenic (Duaime et al. 1989). CH₂M Hill and Chen-Northern (1990) documented dissolved concentrations of copper in excess of 490,000 ppb, zinc in excess of 300,000 ppb, lead in excess of 3,500 ppb, arsenic in excess of 800 ppb, and cadmium in excess of 1,770 ppb in the upper alluvial aquifer near Silver Bow Creek in Butte.

-- but has not identified any of the Montana Resources group as a PRP despite being on notice of their operations and the impact of those operations.

The State's knowledge of the Montana Resources group's operations and their environmental effects is reflected in the fact that Montana Resources has been named a PRP for the evaluation and remediation of the Butte Site under CERCLA by the U.S. Environmental Protection Agency. It is also reflected in a

letter of June 25, 1987, from Dennis Hemmer, Commissioner, Department of State Lands, to Ray Tilman, Manager of Human Resources, Montana Resources, Inc., Butte, Montana. In this letter, Montana Resources was informed ". . . liability for treating and discharging Pit water under the Metal Mine Reclamation Act rests with Montana Resources Inc."

Despite the State's knowledge of Montana Resources' operations and their impact on Berkeley Pit and surface and groundwater resources in and around the Silver Bow Creek/Butte Area NPL Site, none of the Montana Resources group is identified as a PRP in the Assessment Plan. This flagrant and, it would appear, gratuitous violation of the 43 C.F.R. § 11.32(a)(2) requirement undermines the entire Plan.

The United States of America is also a PRP for purposes of any natural resource injury and damages claim involving the Clark Fork River Basin NPL Sites area. The land in and around Butte was originally federal land, and mining claims were staked on virtually all of it. Records at the Billings, Montana Bureau of Land Management office show that almost the entire city of Butte and its surrounding area were located on lands that were originally mining claims. During the period of some of the greatest mining activity, less than one-half of these mining claims had been patented leaving the federal government as owner of the land on which these operations were conducted. In addition, BLM records also reflect that many of the early milling and smelting operations in and around Butte were conducted on federally-owned lands subject to unpatented mining

claims. Moreover, BLM records also show that the federal government owned much of the stream bed, banks and flood plain of Silver Bow Creek and Missoula Gulch for the period prior to 1889, and during the time that extensive mining, milling, smelting and concentrating activities along Silver Bow Creek had commenced and mining and mining operations residues and wastes were being disposed of into Silver Bow Creek. Again, this history is well known to the State, and yet the State has not, in the Assessment Plan, even so much as mentioned the United States, much less identified the federal government as a PRP.

Simply stated, the State of Montana's failure to name either the Montana Resources group or the United States as a PRP in the Assessment Plan is such a significant flaunting of the letter and substance of the regulations that it alone is grounds for withdrawing the entire Plan.

II. TECHNICAL COMMENTS

The comments in this section address the technical and scientific aspects of the State's Assessment Plan, Part I. A technical and scientific review of the Plan demonstrates that the document wholly fails to present accurate, complete, reliable, validated or relevant scientific data to meet the content requirements for an assessment plan as clearly mandated by the applicable U.S. Department of Interior regulations, the further requirements that hazardous substances, natural resources said to be exposed and pathways of exposure be identified, that exposure be confirmed and the yet additional requirements for a Type B assessment; the Plan fails to explain the need for certain sampling studies that have been or are to be undertaken and also fails to provide required information concerning the conduct of the studies, control locations and methods of data analysis; for various of the resources in question; the Plan uses inappropriate data and fails to use the prescribed data; the research plans described in the Plan are inadequate. In short, the Assessment Plan, Part I simply does not comply with or satisfy the clear and detailed prescription

for such a plan set forth in 43 C.F.R. § 11.30 et seq. and other applicable guidance. The comments which follow note the more material deficiencies of the Plan and are not a comprehensive compendium of all of its shortcomings.

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General:

The overall presentation of existing site information and analysis strategy documented in the Assessment Plan does not demonstrate a high level of understanding of the natural and anthropogenic processes that have affected the Clark Fork River Basin. For example, the Clark Fork Basin has been heavily used for agriculture and forestry, has numerous dispersed active and historical mining sites, and has been a major transportation corridor. The impacts on natural resources of all but the mining related activities have been essentially ignored.

The State apparently intends to use comparisons of a very limited number of sites within the Clark Fork River Superfund area with "control" areas as the sole basis for determining baseline conditions. However, no meaningful information is provided in this Assessment Plan concerning the State's methods of choosing the reference areas. For example, the selection of control areas that have undergone physical and chemical alterations similar to those processes noted in the previous paragraph is critical, and there is no indication of whether such a match exists. Indeed, the State identifies only one control area, Thompson Park, and that one is wholly inappropriate. A critical analysis of all other "controls" which the State intends to utilize is absolutely essential to insure that errors manifested in its Thompson Park control designation do not appear in all "controls" and are not compounded in other instances.

Different components of the investigations are treated in drastically different depth. For instance, laboratory techniques and some sampling methods are described in great detail. In contrast, site-specific information regarding the proposed locations of samples and, in particular, locations of control samples, are only briefly

indicated if they are discussed at all by the State. This information is required to be in the Plan; without it, the adequacy of the State's investigations cannot be judged, and the Plan is fatally deficient.

The Plan does not clearly indicate that the State intends to make significant use of historical data in any systematic and comprehensive way. However, significant data exist from studies prior to the mid-1980s that, with appropriate qualification, should be incorporated into the determination of baseline conditions (see 43 C.F.R. 11.72(c)).

Finally, no information relating to sampling, such as the specific identity of the assessment areas and control locations and the numbers and types of samples taken or to be taken, is provided, nor are methods of data analysis discussed in the injury determination sections of the Plan.

In light of these material deficiencies in and omissions from the State's Assessment Plan, Part I and the others detailed below, it is difficult, if not impossible, for ARCO to comment in any intelligent or constructive manner on the Plan. In order to satisfy the requirements of 43 C.F.R. §§ 11.30 et seq. relating to an assessment plan, the State must withdraw and revise this Plan. ARCO reserves its right to comment again and further on any such revised assessment plan or revisions to this Plan.

1.1, page 1,
para. 2

The State's pre-judgment that ".... the Superfund Remedial Investigation/Feasibility Study (RI/FS) program will not sufficiently remedy the injury to natural resources without further action", was addressed in comment 4.5 of ARCO's 25 Nov. 1991 comments on the "Preassessment Screen:" That and other applicable comments are incorporated herein by reference.

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- 1.1, page 4, para. 1 The "Research Plans" section of the Plan (7.0) does not include items enumerated in 43 C.F.R. § 11.31(a)(2). The document does not provide any descriptions of specific assessment or "control" sampling locations identified on maps or in text provided, any specific listing of the numbers and types of samples to be collected, or any specific methods for the analysis of the resultant data. The requirements of 43 C.F.R. § 11.71 (c)(1)-(6) cannot be met without such fundamental information that also is a prerequisite for Quality Assurance requirements set forth in 43 C.F.R. § 11.63(f)(5) and (6). The Assessment Plan should be revised to include such significant specific information.
- 3.2, page 9, para. 1 Contrary to the pronouncement in this section, ARCO was not afforded the opportunity to collect duplicates of the samples mentioned in Sections 7.4.4.1 and 7.5.4, nor has the State offered ARCO any data, split samples or results of analyses.
- 5.0, pages 11-12 In asserting ARCO's responsibility for releases of the listed hazardous substances, the State relies upon sections of the Preassessment Screen that are seriously flawed (see ARCO Preassessment Screen comments, 25 Nov. 1991). No distinction is made regarding the sources of each release, when and where the alleged releases occurred, or whether Anaconda or other mining operations were responsible for the individual sources. ARCO's comments on sections 2 and 3 of the Preassessment Screen are incorporated herein by reference.

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- 5.1, page 12, para. 2 The State implies that all metals loading to the Clark Fork River ("CFR") originates in Silver Bow and Warm Springs Creeks. No mention is made of the contribution of metals (particularly arsenic) from Flint Creek and other tributary drainages. The United States Geological Survey ("USGS") (Lambing 1991) calculated that Flint Creek contributed 20 percent of the arsenic mass to Milltown reservoir during the period 1985-1990 (the time period of the study). In addition, the Little Blackfoot River and Rock Creek combined contributed an additional 10 percent. Since mining and mineral processing in these three watersheds were roughly contemporaneous with similar activities in Butte and Anaconda, there is no reason to assume that delivery of these metals are now increased above historical levels.
- 5.1, page 12, para. 2 The State fails to acknowledge that Ingman and Kerr (1990) discussed the beneficial characteristics of Warm Springs Ponds in serving the function for which they were created. Ingman and Kerr also indicated that, with rare exception, more than 50 to 75 percent of the sediment loads of Silver Bow Creek settle in the ponds, protecting CFR headwaters from sediment deposition. Contrary to the State's description of Warm Springs Creek "as a source of hazardous substances," Ingman and Kerr (1990) described Warm Springs Creek as "important from the standpoint of diluting metal concentrations in the Clark Fork and increasing water hardness."

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6.1, page 13, para. 1 Total recoverable concentrations have little linkage with toxicity in aquatic systems. A cursory examination of the total recoverable metals levels reached on the CFR confirms this fact. If toxicity were closely related to total recoverable metals levels, there would be no life in the CFR. In fact, Lambing (1991) reported that the peak dissolved copper concentration measured on the CFR between 1985 and 1990 was 120 ug/L (12 July 1989) which the State associates with a fish kill. However, during the Spring runoff in the same year, total recoverable copper was reported as reaching 1,500 ug/L without causing fish deaths.

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6.1, page 13, footnote 3 The statement in footnote 3 on page 13 is incorrect. Although EPA Water Quality Criteria were derived from tests in which all the metals were dissolved (thus making no difference if total recoverable or acid-soluble metals were reported), it makes a great deal of difference when the source of these metals is in a mineral structure (Luoma 1989, Elder 1988). No method has ever been accepted by EPA for acid-soluble metals. While EPA (1987) has recommended the total recoverable method, it cautions that this has two impacts: (1) certain species of some metals cannot be measured because the total recoverable method cannot distinguish between individual oxidation states, and (2) in some cases these criteria might be overly protective when based on the total recoverable method. The State conveniently fails to acknowledge these latter comments in footnote 3 on page 13.

This footnote is indicative of a tendency throughout this document to quote total metals concentrations with the assumption that all of the metals mass is bioavailable and therefore directly injurious to natural resources. The exposure of resources to elevated metals concentrations is documented. The hazardous nature of these concentrations has not been adequately demonstrated by the State. No effort has been made in this section to document the bioavailable fraction of the total metals concentration in water, soil, or sediment media even though such data are available (e.g., Tasker 1972; PTI 1991 PSCI Smelter Hill RI/FS Preliminary Site Characterization Study; Lambing 1991).

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6.1, Table 1, It is not valid to compare average metals page 14 concentrations in the Clark Fork River with an arbitrary hardness such as 100 or 200 mg/L and then imply criteria exceedences. Metals criteria are hardness-specific and incorporate contemporaneously measured hardness value as part of the equation. Table 1 considers hardness of 100 and 200 mg CaCO₃ only. Hardness in the CFR may be greater than 700 mg/L during times when metals are at highest concentrations. In such a case the criteria are also higher and exceedences may not occur or be as frequent as the State has implied.

The tabulated hardness and computed criteria values are not representative of the actual ranges reported for the upper Clark Fork River. The Table should be amended to reflect a more realistic range of hardness values.

6.1, page 15, para. 1 The State's continued use of "Total Recoverable" metals to attempt to establish the areal extent of exposure violates the requirements of the Quantification phase stated in 43 C.F.R. § 11.71(h)(2)(i) and (4)(ii). The dissolved portion of the metals should be distinguished from that which is adsorbed to or is a constituent of sediments suspended in water.

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- 6.1, page 15, para. 2 The State's presentation of "as high as" concentrations of copper and zinc in various sections of the Clark Fork River without consideration of the form of the metals or the water hardness in the same samples shows a disregard for factors known to control the potential for injury to trout populations. The EPA criteria documents themselves state uncertainties regarding the applicability of criteria values based on hardness alone and recognize the ameliorative effects on metal toxicity associated with the presence of organic carbon and other site specific characteristics that the State ignores. These should be considered by the State instead of assuming that a single number represents exposures associated with injury.
- 6.2, page 15, para. 2 Many metals, including copper and zinc, are critically important micronutrients. It is therefore incorrect to state that fish have been exposed to hazardous substances until an injury has been shown to occur. Unless injury is proven, there is no basis upon which to allege that the metals in CFR water or sediments constitute a risk or that a hazard pathway exists. Similarly, the presence of total recoverable metal in surface water does not establish injury and thus is not confirmatory of exposure of fish to hazardous substances. The EPA concedes that total recoverable metal concentrations bear little relationship to injury either in the laboratory or in the environment, and have, therefore, permitted and recommended the development of site-specific water quality criteria. Moreover, Lambing (1991) in a USGS summary report of water quality of the Clark Fork River, states "The variable response of aquatic organisms to the different phases of copper might indicate that criteria for acute toxicity may be more applicable to dissolved rather than total-recoverable concentrations." Lambing, 1991, p. 61, para. 4.

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6.2, pages 15- 16, para. 2 Similarly, the mere presence of a substance in an organism does not necessarily constitute "injury to the organism" and cannot be linked to a hazard pathway. 43 C.F.R. summary (D)(2)(e) 1986. Injury must be based on a demonstrable adverse biological response from oil or hazardous substance. 43 C.F.R. summary (D)(2)(e) 1986. In fact, the liver tissue levels reported are lower than many reported in the literature dealing with the nutritional requirements of fish. The fact that many of these tissue concentrations were collected from living and apparently healthy fish is further evidence that tissue concentrations have no relevance to injury. Given that normal, healthy fish had elevated metal levels, it is not surprising that the State of Montana Department of Fish, Wildlife, and Parks found elevated levels of metals in tissues of fish killed by an undocumented source. In fact, the manner in which the text has been written, namely, citing tissue concentrations without reference to control values or toxic effects levels, suggests that it is intended to confuse the reader into believing that these reported levels are proof of copper-dependent injury.

6.2, pages 15- 16, para. 5 Reliable studies using radioisotopic copper have shown that fish exposed to acutely toxic concentrations of copper die before their gills or other organs accumulate significant amounts of copper. (Lauren and McDonald 1986). Even on the naive assumption that copper uptake into the body occurs at the initial gill uptake rate of 90 ng/g wet wt./h, it would take between 5.2 and 10.3 years to accumulate the 407-812 ug/g dry wt gill tissue concentration reported by Phillips and Spoon (1990). The studies relied upon by the State fail to distinguish between accumulation of copper (and other metals as well) in fish while they were living as opposed to copper accumulation on the gills of dead fish.

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6.2, pages 15-16 The State fails to account for the loss of fish resulting from causes such as water withdrawals sanctioned by the State. High levels of metals in gill tissues do not constitute definitive evidence that metals caused the observed mortalities.

6.3, page 16 Nearly all values of metals concentrations listed in text and most of the values listed in Table 2 represent the maximum observed value in each study. In many cases, these are isolated high values and cannot be considered to be representative even of the area sampled by each investigator. Furthermore, many of the studies cited in this section are of limited geographic scope (e.g., Rice and Ray 1985).

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6.3, page 16, para. 1 The State emphasizes specific soil concentrations relative to "background levels" (i.e., "...found almost 300 times higher than the suggested back-ground...") as a measure of injury. The background values of metals in area soils "suggested" by CH2M-Hill (1991) were measured at a site adjacent to the Clark Fork River floodplain immediately upstream of the mouth of Flint Creek. This site is above the elevation of flooding and flood-irrigating, and therefore was not subjected to water-borne metals from either the Clark Fork or Flint Creek. In addition, this site is far enough away from the smelter sources to be out of the influence of airfall deposition. Therefore, these values are in the appropriate range of background metals concentrations for soils of the Clark Fork River away from mineralized zones, but are not inherently applicable to the entire Clark Fork River Basin. Specifically, the concentrations "suggested" by CH2M Hill are below the range of background values expected from mineralized areas, such as the area around Butte and, to a lesser extent, elsewhere in the basin (e.g., Anaconda, Ekalaka). To rely upon these "suggested" concentrations violates the conditions establishing baseline in a mining area which require accounting for such background values. Therefore, any measurement of injury of geological resources should account for potential differences in background levels.

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6.3, page 16, para. 2 Studies by Taskay (1972), Rice and Ray (1985), and Tetra Tech (1987) are quoted as representative of "floodplain[,] . . . irrigated soils[,] . . . [and] soils downwind of the smelters in Butte and Anaconda." The value quoted from Taskey (1972) and Tetra Tech (1987) are the maximum concentrations of metals in airfall-impacted soils within several thousand feet of the Anaconda Smelter stack rather than all soils with elevated metals downwind of the Anaconda and Butte smelters as implied by the State. Data quoted from Rice and Ray (1985) are from a deposit of bare floodplain tailings ("slickens") within 300 feet of the Clark Fork River. These data are not representative of concentrations within the active floodplain of the Clark Fork, and are even less representative of flood-irrigated lands on the floodplain margin. None of these studies is representative of conditions near Butte.

Table 2, pages 5, 17-19 This table purports to present limited mean values of soil concentrations in selected studies. Insufficient information is presented to evaluate the number of samples used in the calculations or as to how the "mean" values are calculated.

6.3, page 20, para. 2 This paragraph purports to discuss bed sediments (based on the topic sentence); however, none of the values quoted in this section applies to sediments in the active, mobile bed of the Clark Fork River. All of the metals concentrations quoted in text of this section refer to floodplain deposits (i.e., Peckham 1979; Ray 1983) and impoundment deposits (Multitech 1987; Moore 1985) which are nearly always metals-enriched relative to adjacent streambed sediments.

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The high levels of metals alleged by the State to be found in sediments of the CFR inhabited by high numbers of healthy fish demonstrate that there is little or no known relationship between sediment metals concentrations and injury (Luoma 1989). Therefore, it is improper to allege the presence of hazardous substances at levels causing injury. It is difficult to assess the difference between soils, sediments, and ore-derived earth in the Butte district of the Boulder batholith. The presence of high metals levels would be expected given the geology of the region.

The State presents groundwater data from the Berkeley Pit, Silver Bow Creek (CR2M Hill and Chen-Northern 1990), the base of the Anaconda Smelter stack (PTI 1990), and Milltown Reservoir (ENSR 1989); Woessner et al.; Montana Power 1987, in Johnson and Schmidt, 1988) as representative values for metals concentrations in groundwater. The values quoted in this section are again extremely elevated concentrations and are not representative of site-wide conditions.

6.4, page 20,
para. 1

The groundwater in a mineral rich geological unit should be expected to have high metals levels because the normal percolation of water between cracks in bedrock creates sulfuric acid which will mobilize metals. Thus, these concentrations of metals may be naturally occurring.

6.5, page 22

The State uses insufficient and inappropriate data to support its claims of injury to vegetation. For example, the highest concentrations of plant tissue cited from the Smelter Hill Operable unit were found in a horsebrush community that covers only two acres.

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6.5, pages 22-23- The State offers no explanation for the inclusion of a discussion of vegetation resources in this Assessment Plan, Part I, given that such a discussion is explicitly excluded from the stated scope of Part I of the Plan.

The State has used Munshower's study as evidence of vegetation exposure, but has neglected to note and acknowledge that the control site used for comparison is on the other side of the Continental Divide in a different geologic unit with different mineral characteristics. The PTI report relied upon by the State sampled numerous different species of vegetation. However, the State cites only the results for one species (horsebrush) which is known to have unusually high uptake capacities. Metal levels in such species bear no relationship to crop plants or the vast majority of non-crop plants found in the CFR Basin. The attempt by the State to contrast "normal" values cited in Alloway (1990) with horsebrush values collected by PTI is clearly a scientifically invalid exercise.

6.5, page 23, para. 1 A myriad of mechanisms exist for plants to develop tolerance to potential elemental stressors. Thus, as recognized in 43 C.F.R. summary (D)(2)(e) 1986: "The mere presence of a substance in an organism does not necessarily constitute injury to the organism."

6.6, page 23 The State presents stack emissions data collected during operations and Mill Creek site data between 1984 and 1986 relative to sites located in Powell and Glacier Counties, Montana. There is no discussion of the current air quality of the site even though such data exist.

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- 6.6, page 23,
para. 1-3
page 24, As with the vegetation resources, the State's inclusion of air quality information in Part I 6.6, of the Assessment Plan is extraneous, para. 1 irrelevant, and explicitly excluded from the stated scope of this document. The State emphasizes the peak concentrations of more recent air quality data, but these peak concentrations are at least an order of magnitude greater than the corresponding average concentration. In fact, for lead, one of the national priority air pollutants, both the average concentration and the peak concentration are below the National Ambient Air Quality Standard. Thus, the stated air concentration of lead is of no regulatory significance. The simple listing of various measured air quality parameters without the proper contextual framework overstates the qualitative comparisons of quantitative air quality data and is materially misleading.
- 7.0, page 25,
para. 1-3 A comparison of the difference between this research plan and the narrative presented in the Preassessment Screen demonstrates that the trustees do not have a research plan based upon evidentiary science. If the State of Montana has acquired significant amounts of data relevant to the State's assessment, those data must be presented in support of relevant studies. The costs of irrelevant research projects which do not bear upon the determination of a dollar value for the injured resource should not be part of the damage claim." 43 C.F.R. summary (C)(4) 1986.

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- 7.0, page 25, para. 3 This section purports to discuss the general geographic areas suspected of warranting assessment but fails to identify the specific locations to be sampled and the numbers and types of samples to be collected for analysis as required in 43 C.F.R. § 11.31(a)(2). These significant omissions render the Plan inadequate and negate ARCO's right and ability to comment on the Plan. ARCO reserves its right to comment further at such time as the State may revise or supplement this Plan with adequate sampling information.
- 7.0, page 25, all The Executive Summary states the plan "...addresses activities associated with injury determination and quantification phases....", but fails in this section and elsewhere to identify "control" areas to be used as reference points in several proposed assessment studies. Specific requirements regarding the selection of control areas are provided in the regulations at 43 C.F.R. § 11.72(d) and (k)(3) that must be addressed generally here and specifically in applicable subsections.
- 7.1, page 25, para. 1 None of the details of studies required by 43 C.F.R. §11.31(a)(2) under the four topics is contained in Section 7.1.
- 7.3.4, page 29 In defining the concentrations of hazardous substances identified in fish toxicology, the trustees should be assessing dissolved concentrations of metals, not total metals.
- 7.3.4, page 29 Without specific identification of the control sites which the State anticipates using to define baseline for surface water conditions in the CFR, ARCO cannot comment on whether control sites are appropriate.
- 7.3.4, page 30 The Plan fails to define "sediments" relative to this injury determination and to injury determinations for geological resources and for sediment resources, which would appear to invite impermissible double-counting.

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COMMENTS7.4.2, page
32,
para. 3

The fish populations in tributaries in the upper Clark Fork River basin are comprised predominantly of brown trout, while rainbow trout are common in Rock Creek. The elimination of bull trout and west slope cutthroat from the main stem Clark Fork River is not surprising, inasmuch as cutthroat are far more susceptible to angling pressure and interspecies competition than other species. Thus, the introduction of brown trout into the basin by the State likely contributed to the reduction of cutthroat trout in the Clark Fork River. Bull trout generally prefer streams with higher gradients than those found in the Clark Fork River and therefore it is not surprising to find them absent. The State's citation to the variety of trout species in the Blackfoot River fails to recognize the finding of Moore *et al.* (1991) where cutthroat and brook trout dominate headwaters near abandoned mining operations and brown trout become dominant downstream below a marsh "barrier." Moreover, the same paper documents rainbow trout population in more downstream sections of the Blackfoot River, the same pattern reported for the Clark Fork.

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7.4.2, page
33, para. 2

The State implies that the current reduction in trout densities is attributable solely to water quality degradation. However, other land use activities may be contributing to any apparent reductions and must be accounted for in order to quantify water quality related injury. The last sentence of the paragraph; "in comparison other large trout rivers in Montana support 2,000 to over 3,000 catchable trout... (Knudson 1984)" implies that a direct comparison can be made with the Clark Fork River to these systems. However, the rivers are not named and those supporting 2,000 to 3,000 trout per mile may differ substantially in their geomorphologic and hydrologic characteristics and would not be suitable for comparing to the CFR. Sections of some of Montana's "blue ribbon" trout streams also have relatively low populations of trout which can be attributed to other, non-water quality related impacts (e.g., lack of physical habitat in sections of the Madison River has resulted in substantial decreases in population within these reaches, i.e., 2,000 fish per mile above and below the reach - about 600 fish per mile within the reach containing reduced habitats). Other factors influence population density in streams, a point not taken into account in the Plan.

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33, para.

This statement of research objectives discards 1 scientific method by concluding that fishery resources of the Clark Fork River have been injured as a result of exposure to hazardous substances released from four NPL sites. It appears that other factors such as dewatering, channelizing, etc. will not be considered. It is impossible to determine either the baseline conditions, or injuries due to the NPL sites without consideration of effects of other factors on fish production in the river. Any other flaws in specific research methods are minor compared to the underlying a priori decision to ignore alternative etiologies. The State's approach ignores the specifically required considerations set forth in 43 C.F.R. §11.72.

7.4.3, page
33,
2nd bullet

The State refers to control sites to which to compare trout population numbers. The selection of valid control sites from which to make comparisons of population numbers etc., is a critical step in the quantification of injuries attributable to water quality. However, Section 7.4 does not describe the procedures to be used by the State for selecting these "control sites" nor does it list the candidate sites the State has apparently already selected for this purpose. This significant omission must be rectified before studies begin, as required in 43 C.F.R. § 11.32(e)(2)(i).

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- 7.4.4.1, page 34, para. 1 Proof of injury can be demonstrated only if the four criteria cited under 43 C.F.R. §11.62(f)(2) are met. These assure that the injury must (1) "often be the result of exposure," (2) "is known to cause this biological response in free-ranging animals," (3) "is known to cause this response in controlled experiments," and (4) "is practical to perform and results in scientifically valid results."
- Contrary to the spirit of the law, the studies referenced in this section have already begun, and in one case have already met with failure. ARCO should not be held liable for any such costs which result from poorly conceived studies. In fact, dietary studies have already been conducted using rainbow trout at dietary copper and zinc concentrations far in excess of any possible on the CFR. Regardless of the outcome of these tests, there is no evidence that the response will occur in free-ranging animals.
- 7.4.4.1, page 34, para. 3 There is no indication that trout in the CFR actually feed on the organisms collected, or in what proportions, or at what concentrations of metals. Moreover, there is no indication that hatchery fish feed at the same rate as fish in the wild.
- 7.4.4.1, page 35, para. 1 The evaluation of these biomarkers (and any other enzymes) will not provide a meaningful indication of injury, and, thus, the costs associated with this research do not constitute reasonable costs. It is unclear why vitamins were added to the test diets since they do not constitute a normal part of the diet on the CFR.

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- 7.4.4.1, page 35, para. 3 Toxicity testing should be conducted to represent CFR conditions with regard to water hardness, alkalinity, pH, DOM and dissolved metal concentrations. If this is not known and cannot be scientifically derived, the State should collect considerable additional data before submitting an assessment plan that includes water quality assessment.
- 7.4.4.1, page 36, para. 2 The validity of this exercise is very much in doubt for a number of reasons relating to controls such as whether adjustments were made to provide for the eating habits and patterns of juvenile fish.

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7.4.4.1, page 36, para. 4 The State appears to have made an a priori decision that only tests the hypothesis that metals are responsible for the alleged effects on CFR fisheries. This ignores the scientific method and assures that the results will be inconclusive except as laboratory experiments. This is a fatal flaw. Furthermore, none of the proposed "physiological" endpoints (i.e., lipid peroxidation, stress proteins, metallothionein, histopathology) can be related to injury determination or effects on fish populations. Moreover, the State's experiments fail to address comparability of avoidance/attraction behavior of fish in the laboratory and in nature. No procedures for analyzing the results are stated, and no bases for the statistical certainty of avoidance or attraction have been established. These are significant omissions that need to be remedied. Without such information, the validity of and weight to be given to conclusions of the studies cannot be assessed, and ARCO's ability to evaluate and comment upon the work is materially impaired.

The entire series of proposed experiments seeks to show the cause for an effect that has not been assessed, much less shown. Furthermore, the experiments proposed are simply a number of typical, unrelated, bioassays and show little attempt to formulate a chain of logic. Rather, they represent the "shotgun" approach to research.

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Since the dietary and aqueous exposures will not replicate natural exposure conditions, there is little point of histological examinations of fish tissues. Furthermore, Smith (1989) has already reported that there were no location-dependent pathological changes in fish collected from five stations in the mainstem CFR and those collected from a reference site. In fact, these are the same fish which the State has alleged to show evidence of injury based on metal tissue concentrations. Thus, the State has already shown there is no relationship between tissue-metal concentrations and injury based on histopathology. Unfortunately, without access to the SOPs for the proposed biomarker bioassays, it is not possible for ARCO to comment further.

- 7.4.4.1, page 36, para. 5 Because there is no evidence of metal-dependent population effect on the CFR trout, there is no reason to conduct physiological studies. These experiments do nothing to link injury to exposure. In sum, those studies are neither necessary nor reasonable.
- 7.4.4.1, page 36, last para. The biological function of stress proteins, metallocionein, or lipid peroxidation in fish is totally unknown. Therefore, changes in these biomarkers cannot be linked to injury, and such measurements will prove nothing. Again, these efforts do not constitute reasonable or necessary research.

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- 7.4.4.1, page 37, para. 1-3 Since the dietary and aqueous exposures will not replicate natural exposure conditions, there is little point of histological examination of fish tissues. Furthermore, Smith (1989) has already reported that there were no location-dependent pathological changes in fish collected from five stations in the mainstream CFR and those collected in Rock Creek, a reference tributary. In fact, these are the same levels that the State is alleging to show injury in 6.2. The Plan does not address how the results of these sampling experiments will relate, if at all, to injury determination under the applicable regulations.
- 7.4.4.1, page 38, para. 1-4 The Plan wholly fails to indicate how, if at all, the critical conditions of these experiments, including diet, acclimation, concentration of metals, DOM, water hardness, pH and alkalinity compare to conditions at the relevant areas of the CFR. Without that information, ARCO is unable to comment intelligently and constructively on the validity and meaningfulness of these experiments.
- 7.4.4.1, page 38, para. 5; page 39, para. 1-6 Again, it is essential that bioassay conditions should reflect those found in the CFR, including DOM levels. The State's plan to use total recoverable metals as the measure of criteria compliance is not consistent with the proposed method that "[a]ll samples will be collected, filtered, and preserved according to NFCRC SOP C5.134." It is inappropriate to conduct bioassays based on dissolved metals and then attempt to extrapolate this data to total recoverable metals.
- Abnormal behavior in an artificial bioassay devise cannot necessarily be extrapolated to reach any conclusions with respect to populations of fish in the CFR. The State provides no information as to how attraction would be judged and, therefore, prevents ARCO from being able adequately to comment on this important point.

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7.4.4.1, page 40,
para. 2 The State does not provide any means of determining the relationship between hatchery rainbow trout survival and CFK rainbow trout populations.

7.4.4.1, page 40,
para. 4-6 Fish kills allegedly occurred in July, but the exposure conditions attempt to simulate minimum Spring conditions. The State does not define how the water will be comparable to the Clark Fork River. The State does not indicate to what part of the CFR the water will be comparable or what constituents will be comparable. Without this information, ARCO is unable to comment on this important issue.

7.4.4.1, page 40,
para. 7 The State fails to indicate how physiological acclimation will be determined. In fact, the Assessment Plan contradicts itself -- acclimation is considered complete in Task 1 after 2 weeks and in Task 2 after 1 month.

7.4.4.1, page 41,
para. 1 The State appears to presume that CFR dissolved metal concentrations are elevated for 96 hours at a time. This is clearly not borne-out by USGS or State of Montana water quality data.

7.4.4.2, page 41,
(subsection 1), para. 1 The Assessment Plan fails to indicate which combinations of valley bottom type were evaluated, which portions of Silver Bow Creek ("SBC") and the Clark Fork River were evaluated, and how "control reaches" were similarly evaluated. Without these data, ARCO cannot meaningfully assess and comment on this aspect of the State's work.

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7.4.4.2, page 41, (subsection 1), para. 2 Reference is made to fish sampling at all test and control reaches over the period July - October 1991. With four sample sites from each of the distinct reaches, this implies that 72 sites were sampled for the test areas (SBC/CFR), and a comparable number of sites for the control reaches. Again, more detail is needed to determine whether this sample program will be sufficient for injury quantification purposes. The Assessment Plan does not indicate whether sampling was completed seasonally, monthly, two times, one time, at each of the sites.

7.4.4.2, page 41, The Assessment Plan again refers to "control para. 1 sites" to which to compare population numbers. The assessment plan must provide a description of the procedures to be used in selection of control sites. DOI regulations 43 C.F.R. § 11.72 (d)(1)-(7) provide guidance in the selection of control areas. Subsection 11.72(d)(1) states that "one or more control areas shall be selected based upon their similarity to the assessment area and lack of exposure to the discharge or release." Subsection 11.72(d)(3) states "the comparability of each control area to the assessment area shall be demonstrated to the extent technically feasible, as that phrase is used in this part." The Assessment Plan is fatally deficient in its failure to provide these specifics as to the selection of control sites for these studies.

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7.4.4.2, page 41, para. 2-4 As the State has not demonstrated that trout populations are reduced in the assessment area (see comments to Section 7.4.2 supra), the State may not proceed beyond an adequate preassessment screen (in contrast to the materially deficient Preassessment Screen issued by the State). Furthermore, the State cannot design its studies around the a priori conclusion that elevated metals levels are the only cause of trout population changes.

Given that it is difficult to distinguish rainbow trout parr from brown trout parr in the field, it is doubtful this could be done underwater when the fish and water are moving.

7.4.4.2, page 42, para. 1 The State indicates that one of the four population sites within each of the reaches was randomly selected for IFIM measurements. This suggests that no replicates were made for these habitats and therefore measurement of the variability of the habitats within each reach cannot be made.

Reference is made to trout suitability curves for use in the PHABSIM model. The State, however, does not indicate what data will be used for preparing the habitat suitability curves. There is no indication whether site-specific data have been collected, what analyses will be performed and how the results will be used to define baseline and service reductions.

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7.4.4.2, page 42, para. 2 Because of the inherent suspended load of sediments within the CFR, the use of snorkeling to provide an accurate estimate of numbers and species composition is questionable.

In general, the collection of field data and conduct of laboratory (toxicity) studies are focused only on water quality/toxicological impacts that may be occurring in the CFR. An accurate quantification of the injury to the fishery/aquatic resource cannot be made without consideration for other factors that may potentially be limiting the trout populations. The Assessment Plan fails to include any discussion or proposed procedures for assessing these other non-mining related impacts to the resource. The omission of studies to evaluate other impacts to the resource is clearly a significant and systematic bias that needs to be corrected in the overall assessment plan design.

7.5.2, page 43 para. 1 The Assessment Plan fails to identify or describe the "background" or "control areas" to be used in connection with "...bed sediments of Silver Bow Creek from Butte to Warm Springs Ponds, the Warm Springs Ponds, and the Clark Fork River from Warm Springs Ponds to Missoula [which are said to] contain significantly elevated concentrations of hazardous substances relative to background, or control areas."

7.5.4, page 44 This section details sediment sampling on Silver Bow Creek, the Clark Fork River, and principal tributaries of the Clark Fork River. If other geologic resources are being considered, no research plan is presented.

The research plan does not indicate how grain-size fraction dependent variations in metals concentrations or bioavailable metals concentrations will be determined for streambed sediments.

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COMMENTS7.5.4, page
45, para. 2

The Assessment Plan wholly fails to address how data on carbon fractions will be used in the quantification of injury. This information is necessary for ARCO to be able to evaluate and comment upon this procedure.

7.6.4, page
47, para. 1

The text does not detail the methods or requirements for the collection of groundwater samples as required by 43 C.F.R. § 11.62(c)(2).

7.6.4, page
47, para. 1-2Thompson Park

Groundwater quality in the vicinity of Thompson Park has not been demonstrated to be an appropriate control for Butte groundwater quality.

The Plan's statement on groundwater samples does not provide sufficient specific information to assess how the quantification of injury will be determined. There is no reference to the construction and relative location of the wells either to each other or to the geohydrologic unit.

7.6.4, page
48, para. 1-2

The research plan does not explain how field data that are not measurements of hazardous substances will be used in the quantification of injury.

COMMENTS ON APPENDIX A

The DOI Regulations require that the Assessment Plan include, "a Quality Assurance Plan that satisfies the requirements listed in the NCP and applicable EPA guidance." 43 C.F.R. § 11.31(c)(3). The NCP, in turn, provides for a "quality assurance project plan, which describes policy, organization and functional activities and the data quality objectives and measure necessary to achieve adequate data used in selecting the appropriate remedy." 40 C.F.R. § 300.430(b)(8)(ii). The "quality assurance project plan" is defined under the NCP as,

a written document associated with all remedial site sampling activities, which presents in specific terms the organization (where applicable), objectives, functional

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activities and specific quality assurance (QA) and quality control (QC) activities designed to achieve the data quality objectives of a specific project(s) or continuing operations . . .

40 C.F.R. § 300.5 (emphasis added). For the reasons set forth below, the State's Quality Assurance Project Plan (QAPP) in Appendix A fails to satisfy the requirements of the NCP and applicable EPA guidance for a QAPP, and does not meet the requirements of 43 C.F.R. § 11.31(c)(3).

The State must revise the QAPP to satisfy the requirements set forth in the NCP and applicable guidance, and provide ARCO with an opportunity to comment upon the revised QAPP. Without such revisions, the State has not defined adequately the data quality objectives to satisfy the requirements of the NCP and the DUI regulations. At a minimum, the QAPP must be equivalent to the Clark Fork River Superfund Site Investigation QAPP, which the State participated in developing and which the State and EPA have required from ARCO.

A. GENERAL COMMENTS

Appendix B of Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (U.S. EPA 1988) includes a summary of the required elements of a QAPP (the "Federal Guidance"); See also QAPP for the Office of Emergency and Remedial Response and Office of Waste Programs Enforcement, OSWER Directive 9200.1-05. Appendix A, Quality Assurance Project Plan of Assessment Plan: Part I Clark Fork Basin NPL Sites, Montana (a.k.a. State of Montana QAPP) (State of Montana 1992) does not follow the Federal Guidance. Several required elements are not included, while several additional elements are materially deficient, as described below.

Under the Federal Guidance, there are 15 required elements in a QAPP. These elements (including the Table of Contents) are defined explicitly in the Federal Guidance. The outline of the required elements for a QAPP, as contained in the Federal Guidance, is presented below.

- 1.0 Table of Contents
- 2.0 Project Description
- 3.0 Project Organization and Responsibilities
- 4.0 QA Objectives for Measurement

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- 5.0 Sampling Procedures
- 6.0 Sample Custody
- 7.0 Calibration Procedures
- 8.0 Analytical Procedures
- 9.0 Data Reduction, Validation, and Reporting
- 10.0 Internal Quality Control
- 11.0 Performance and Systems Audits
- 12.0 Preventive Maintenance
- 13.0 Specific Routine Procedures to Assess Data (Precision, Accuracy, and Completeness)
- 14.0 Corrective Actions
- 15.0 Quality Assurance Project Plans (Method for Reporting Performance)

The State of Montana QAPP does not follow the Federal Guidance, as is reflected by the table of contents of the State of Montana QAPP:

- 1.0 Introduction
- 2.0 Project Organization and Responsibility
- 3.0 Overview of QA/QC Targets for Chemical Data
- 4.0 Data Quality Objectives
- 5.0 Quality Control Procedures for Field Sampling and Measurements
- 6.0 Quality Control Procedures for Sample Collection, Handling, and Preservation
- 7.0 Quality Control Procedures for Quality Control Samples
- 8.0 Quality Control Procedures for Sample Custody
- 9.0 Quality Control Procedures for Sample Analysis
- 10.0 Internal Quality Control
- 11.0 Data Validation
- 12.0 Quality Assurance and System Audits
- 13.0 Database Management

The most significant deviations from the NCP and Federal Guidance for the State of Montana QAPP are summarized below:

- Sections 3.0 and 4.0 of the State of Montana QAPP do not contain detection limits for non-metal analytes (e.g., chloride, sulfate, total organic carbon, bicarbonate, carbonate). Cf. Section 4.0 of the Federal Guidance.
- Sections 5.0 and 6.0 of the State of Montana QAPP include brief discussions of the objectives of field measurements. These objectives will be accomplished

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by ". . . using experienced field personnel, good sampling techniques, proper sampling equipment and equipment decontamination procedures." There is no reference to a sampling and analysis plan (SAP) or standard operating procedures (SOPs) for collecting samples. The next paragraph states that field sampling and measurements will comply with U.S. Department of the Interior (DOI) Natural Resource Damage Assessment (NRDA) regulations, as appropriate. Because sampling methodologies are not included in the DOI NRDA regulations, the QAPP states that the sampling will be conducted using generally accepted methods as approved by the Quality Assurance Reviewer. This discussion of sampling techniques in the State of Montana QAPP is not sufficiently comprehensive and lacks the specificity required by the NCP and the Federal Guidance. The Federal Guidance requires discussion of nine criteria for each measurement, and suggests incorporating this information by reference to the Compendium of Superfund Field Operations Methods (U.S. EPA 1987). The State of Montana QAPP should define the sampling procedures explicitly or refer to a project-specific SAP.

- Examples of chain-of-custody records and sample analysis request forms should be included in Section 8.0 of the State of Montana QAPP according to Section 6.0 of the Federal Guidance. The State of Montana QAPP does not include example forms.
- Section 9.0 of the State of Montana QAPP is inadequate. Section 9.0 is intended to cover Section 8.0 (Analytical Procedures) of the Federal Guidance. According to the Federal Guidance, this section should include a reference or SOP for each measurement. The State of Montana QAPP only references "U.S. EPA methods." No specific methods are referenced in the State of Montana QAPP. It is therefore not clear what methods will be used to analyze samples. This section of the State of Montana QAPP is materially deficient. An alternative to including analytical procedures in the QAPP is the existence of a Laboratory Analytical Protocol (LAP) document, which includes analytical procedures. The Clark Fork River Superfund Site Investigations QAPP (ARCO 1992a) refers to the Clark

ASSESSMENT PLAN,**PART I:****Sec. No.,****Page No.,****Paragraph No.****COMMENTS**

Fork River Superfund Site Investigations LAP (ARCO 1992b) for specific analytical methods.

- Section 10.0 of the State of Montana QAPP implies that metals are the only analytes, and does not cover QC for non-metals analytes. For consistency with the Federal Guidance, the specific procedures for assessing precision, accuracy, and completeness should be a separate section.
- Section 11.0 of the State of Montana QAPP, Data Validation, relates to Section 9.0 of the Federal Guidance. This section of the State of Montana QAPP covers data validation by presenting bulleted lists of criteria used for assessing the validity of data. The lists are not accompanied by narrative discussing any specific assessment criteria, or references to EPA guidance for data validation. The text must be revised to specify how data will be assessed and referencing EPA guidance.
- Section 12.0 of the State of Montana QAPP does not include a discussion of field audits, as required by Section 11.0 of the Federal Guidance.

The following QAPP elements required by Federal Guidance are not included in the State of Montana QAPP:

- This section discusses only laboratory audits. Calibration Procedures, Section 7.0 of Federal Guidance, are not addressed directly or by reference to specific analytical methods.
- Corrective Actions, Section 14.0 of Federal Guidance, are not included in the State of Montana QAPP.
- Methods for Reporting Performances, Section 15.0 of Federal Guidance, are not included in the State of Montana QAPP.

In addition to a lack of consistency with the Federal Guidance, there are several critical technical problems with the State of Montana QAPP. These are summarized below:

- No method references are included in the QAPP. In several instances, the term "U.S. EPA Methods" is

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PART I:
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Page No.,
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COMMENTS

used; however, no method references are given. The document implies that metals will be analyzed by the Contract Laboratory Program (CLP), but this method is not referenced in the document. There is no reference to sample preparation for plant tissue or other solid matrix samples, and there are no references for non-metals analyses.

- The project detection limits for metals in Table A-1 are too high compared to detection limits achievable by CLP protocols. An explanation for the elevated detection limits should be included. If the detection limits presented are for solid matrix samples, this information should be provided.

In Table A-2, the State has proposed to expand control limit windows for data quality objectives for solid matrices from those set forth in EPA Guidance for inorganic CLP data as summarized in Functional Guidelines. ARCO has supported the expansion of control limit windows for field and laboratory duplicate RPDs, matrix spike recoveries, and ICP serial dilutions for solid matrix samples within the Clark Fork River Basin on a regional basis, as set forth in ARCO's "CLP Performance Database Document" (PTI 1990). In a February 14, 1992 letter to ARCO, EPA rejected ARCO's proposal for the region-wide expansion of the control limit windows. EPA continues to require site-specific justification for expansion of control limit windows.

ARCO understood that the State supported EPA's approach for site-specific justification for expansion of control limit windows, rather than an expansion of the control limit windows region-wide as ARCO has proposed. If this is not the case, and the State endorses a regional expansion of the control limit windows throughout the Clark Fork as indicated by Table A-2, the same expanded windows should apply to ARCO data on a regional basis.

If the State supports EPA's position that site-specific justification for expansion of control limit windows is required, then the State must provide justification on a site-specific basis for the expanded criteria for data quality objectives in Table A-2 in Appendix A. No justification is provided in Appendix A. Without such justification, the control limit windows for solid matrices required by the EPA Guidance

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COMMENTS

for inorganic CLP data as summarized in Functional Guidelines must apply.

B. SPECIFIC COMMENTS

Appendix A,
QAPP
4.0, page A-
5,
Table A-1

Project detection limits stated for cadmium, copper, and lead are vastly in excess of those required to achieve the measurement objectives for metals in water proposed in Section 7.4.4. These should be made consistent with the individual study objectives and the content of SOPs governing those studies.

Page A-5

Sample preparation procedures for all matrices should be added to the QAPP.

Page A-6,
Table A-1

The project detection limits for arsenic (30 ppb), cadmium (20 ppb), lead (35 ppb), and selenium (30 ppb) are too high for liquid samples. In the Clark Fork River Superfund Site Investigations Quality Assurance Project Plan (QAPP), the target detection limits are as follows: Arsenic - 10 ppb, cadmium - 5 ppb, lead - 5 ppb, and selenium - 5 ppb.

The project detection limits for all metals are inappropriately low for all solid matrices (e.g., sediments, soils, plant tissues).

The detection limits should be given to mg/kg or ug/L to distinguish between solid and aqueous matrices.

There is no discussion of detection limits for various matrices or non-metals analytes. These detection limits should be added to this section.

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PART I:
Sec. No.,
Page No.,
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COMMENTS

- Page A-7,
Table A-2 The data quality objectives for solid matrices should be consistent with EPA guidance for inorganic CLP data as summarized in Functional Guidelines. If data quality objectives deviate from EPA guidance for solid matrices, justification for these objectives should be presented.

The same comment above applies to the tissue matrices.
- Page A-8,
Table A-3 The preservation and holding time requirements appear to be for aqueous samples only. The same conditions that apply to water samples do not necessarily apply to soil samples. The tables in the Clark Fork QAPP are more informative.

The methods of analysis are not listed anywhere in the State QAPP. They only specify that EPA methods will be used in general.
- Appendix A,
QAPP
4.0, page A-
9,
Table A-4 The "Analytical Spike" and MSA-3 spike QC limits for Fish and Animal Tissue are not but must be clearly specified, because they represent acceptance criteria for the data generated by the State.

ASSESSMENT PLAN,
PART I:
Sec. No.,
Page No.,
Paragraph No.

COMMENTS

Page A-9,
Table A-4

Matrix Spikes and Matrix Duplicates.

Matrix spike duplicates are typically only required for organic analyses. If matrix spike duplicates will be analyzed for inorganic analyses, justification for this additional laboratory quality control sample should be included.

The data quality objectives for soils are lower, than necessary. They are recommending a control limit of $100 \pm 50\%$ for accuracy. It should not be difficult for the laboratories to achieve control limits of $100 \pm 35\%$ for soils.

This table implies that the control limit for matrix spike recovery is $100 \pm 50\%$ and for matrix duplicate relative percent difference (RPD) is $\pm 35\text{RPD}$ for water samples; whereas, Table A-2 lists the control limit for matrix spike recovery as $100 \pm 25\%$ and the matrix duplicate RPD as $\pm 25\text{RPD}$ for water samples.

For tissue analyses, see comment for Page A-7
Table A-2.

The table suggests that the frequency of matrix spike and matrix duplicate analyses is one for every 20 samples analyzed. This table should state that 1 matrix spike and matrix duplicate will be required for every 20 samples or for every digestion group, whichever is most frequent.

Laboratory Control Samples

The laboratory control sample should be analyzed at a frequency of 1 for every 20 samples in a digestion group or 1 for each digestion group, whichever is the most frequent. The purpose of the laboratory control sample is to ensure that the quality of the samples are maintained throughout the sample preparation procedures. This cannot be determined if a laboratory control sample is not included in every sample digestion group.

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PART I:
Sec. No.,
Page No.,
Paragraph No.

COMMENTS

Continuing Calibration Blanks

The frequency of analyzing the continuing calibration blanks could present some problems when the data are being validated. If blank contamination is present, then it is possible that all 20 samples could be affected. However, if the frequency were increased to 1 continuing calibration blank for every 10 samples analyzed then fewer samples would be affected in the event of contamination problems.

Preparation Blanks

The table suggests that the frequency of preparation blank analysis is one for every 20 samples analyzed. This table should state that 1 preparation blank analysis will be required for every 20 samples or for every digestion group, whichever is more frequent.

Appendix A,
QAPP
4.0, page A-
7,
Table A-2

This table contains no requirements for fish and animal tissue accuracy, precision, and completeness objective. They should be included as should a statement of whether a dry or wet basis will be used in determining the achievement of objectives.

Page A-13,
Section 4

Kimwipes should not be used for the cross contamination swipe, due to possible sulfur contamination. Only laboratory analytical-grade filter paper should be used for the cross contamination swipe.



ADMINISTRATIVE RECORD
United States Department of the Interior



OFFICE OF THE SECRETARY
OFFICE OF ENVIRONMENTAL AFFAIRS
DENVER FEDERAL CENTER, BUILDING 56, ROOM 1018
P.O. BOX 25007 (D-108)
DENVER, COLORADO 80225-0007

March 19, 1992

Mr. Dick Pedersen
Natural Resource Damage Program Manager
Environmental Sciences Division
Department of Health and Environmental Sciences
Cogswell Building
Helena, MT 59620

RECEIVED
MAR 23 1992
NATURAL RESOURCE
DAMAGE PROGRAM

Dear Mr. Pedersen:

In response to your January 27, 1992 public notice, we have reviewed the draft Assessment Plan: Part I, Clark Fork River Basin NPL Sites, MT.

At the outset, we wish to commend the State of Montana for its repeated and ongoing efforts to coordinate your natural resource damage assessment efforts with those of the other trustees for natural resources.

As you are aware, the Department of the Interior (as well as the Department of Agriculture and the Confederated Salish and Kootenai Tribes) also acts on behalf of the public as trustees for natural resources pursuant to Section 107(f) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, and 40 CFR Part 300. In this capacity, we have the responsibility to assure the restoration of natural resources under our trusteeship which have been injured, lost, or destroyed as a result of releases of hazardous substances.

We recognize that the State's claim for natural resource damages was filed in 1983, and the schedule for your natural resource damage assessment has been established by court order. The United States is not a party to this litigation. Moreover, we are barred by Section 113(g)(1) from commencing an action for damages until after selection of remedial actions at the various National Priority List sites along the Clark Fork River.

Accordingly, we cannot participate in the State's damage assessment, and it will likely be some years before we can bring our own natural resource damage action. Nonetheless, resolution of the State's litigation does not bind other trustees, nor does it constrain our independent authority to seek natural resource damages.

Enclosed are specific comments on the Assessment Plan: Part I.

These comments are provided on a technical assistance basis only. They do not constitute a position the Department of the Interior may take regarding possible injury to, loss of, or destruction of natural resources under our trusteeship, nor possible future action on our part to recover damages for

such injury, loss, or destruction. Moreover, they do not constitute participation in the State's natural resource damage assessment, and should not be construed as such.

Sincerely,



Regional Environmental Officer

Enclosure

cc: Field SOL/Billings, J. Chaffin
DOJ, P. Karmel
USDA/GC, K. Pitt
FWS/Denver
FWS/Helena
BIA/Portland
BLM/Billings
NPS/Denver
NPS/Grant-Kohrs Ranch
OEA/HQ

TECHNICAL COMMENTS ON THE STATE OF MONTANA'S DRAFT ASSESSMENT PLAN - CLARK
FORK RIVER BASIN NPL SITES - PART I

General Comments

1. We suggest that the authors provide a definition for "control sites" as used in the section entitled Objectives of Research Plan. We further suggest that a series of reference tributaries be identified and described in this section.
2. We suggest that in the Physiological Impairment section of the study the number of fish and water samples be increased to at least ten and that they be analyzed individually so as to provide variance estimates and ranges of metal contamination.
3. We suggest in the section on Influence of Acclimation/Adaptation on Toxicity that a pulse event be attempted after the trout have acclimated to sub-lethal mixtures of metals.
4. Sampling and data collection methods appear to be confined to the immediately affected area or areas adjacent to the individual Operable Units of the various NPL sites. We suggest that the sampling protocol include sites throughout the drainage which may have been affected by releases of hazardous substances through the air pathway as well as the water pathway.

Page-Specific Comments

Page 12, paragraph 2, 5.1, Sources of Hazardous Substances - Including the amount of contaminated sediments, estimated at 19 million cubic yards, contained in the Warm Springs Ponds would add consistency to the source descriptions.

Page 15, paragraphs 1-3, 6.1, Surface Water Resources - The water quality criteria for the protection of freshwater aquatic life vary with the water hardness. Are the comparisons described in these paragraphs based on hardness-corrected criteria?

Page 15, paragraph 5, 6.2, Biologic Resources: Fisheries - Mention is made of metals concentrations found in tissues of fish inhabiting the Clark Fork River. A comparison to the "normal" range of metals concentrations found in these fish tissues would be informative.

Page 29, 7.3.3, Objectives of Research Plan - We suggest that the authors include here a definition for "control sites". You may also wish to consider using other streams in the Clark Fork drainage as "control sites". This idea is put forth on page 39 under Task 3, Avoidance, where three streams are mentioned as models for simulated-water chemistry regimes. Rock Creek is soft water, Little Blackfoot is medium hard water, and Warm Springs is hard water.

Page 37, 2, Physiological Impairment - Regarding the discussion in the third paragraph, we suggest that the minimum number of fish and water samples should be at least ten and that they be analyzed individually so as to provide variance estimates and ranges of metal contamination.

Page 37, 3, Acute Toxicity in Pulse Events - We suggest that water quality data collected during pulse events be listed. This would be helpful in evaluating the issue of periodic fish kills in the river which are presumably caused by high concentrations of metals. Also, has consideration been given to also varying the Ph during these pulse exposures?

Page 38, Task 1 - We would suggest including the rationale for limiting the pulse exposure to two hours.

Page 40, 5, Influence of Acclimation/Adaptation on Toxicity - Under Task 1, it would seem a convenient time to again attempt a pulse event after the trout had acclimated to sub-lethal mixtures of metals. This is probably a better simulation of what is occurring in the Clark Fork River. A second variation would be to acclimate the fish to a sub-lethal mixture of metals, then follow with an increased pulse-dose at a lowered Ph. This could perhaps be from an acclimation pH of about eight then pulse at a pH of about 6.5, again, to simulate conditions which occur in the river which lead to a fish kill.

RECEIVED

4/25/92

APR 29 1992

ADMINISTRATIVE RECORD

NATURAL RESOURCE
DAMAGE PROGRAM

Dear Mr. Pedersen

My name is Lee Snow
and I have lived in
Anaconda Mt. all of my
life, I worked for the
B&A&P railroad for 34
years so I know how
the pollution problem was
handled in the past. Now
that there is to be a
attempt to clean up the
mess that was made over
the years, I think it should
be done right. I believe that
removing all of the hazardous
waste material from the Clark
Fork drainage and placing it
in a dry area would be
the correct way to address

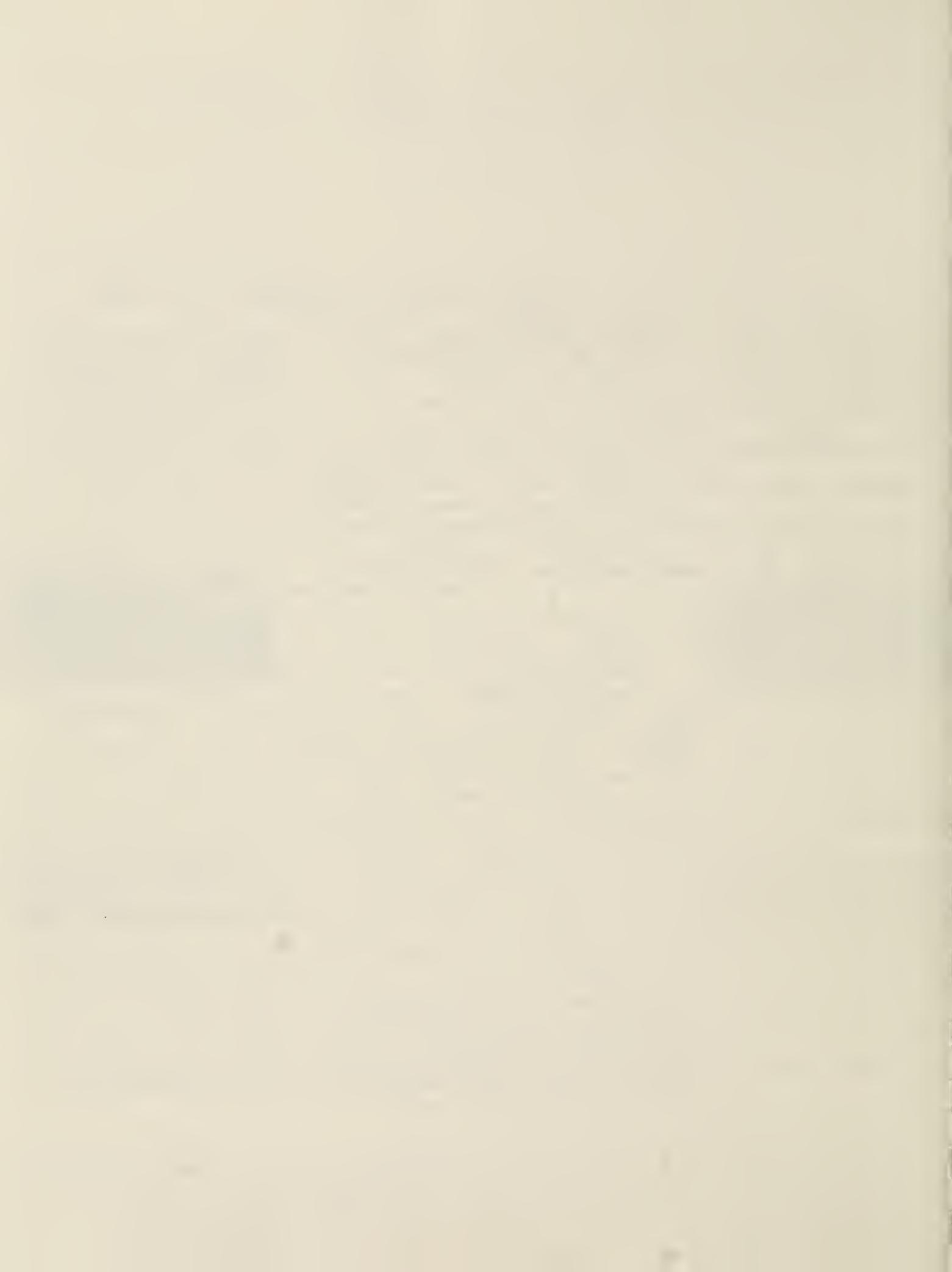
2.06.01.02

the problem, not by moving it from one location to another, in the same drainage area. (Colorado tailings to Opportunity Ponds.) This idea is a patch and not a fix, because we know that the opportunity ponds are surrounded by 5 different creeks, Mill creek, Lost creek, Warm springs creek, Willow Creek, and Silver Bow Creek. and in the past we have had releases of hazardous material from these ponds. There also is the problem of airborne pollution, since most of the hazardous material is in the form of fine sand like material it is, and will

continue to be spread over
the entire Clark Fork River
Basin.

Let us clean it up once
and do it right, so we will
not be subject to continued
contact with these hazardous
materials,

Lee Swan,
P.O. Box 205
Anaconda, MT 59711



To Dick Pedersen 5.4.92

ADMINISTRATIVE RECORD

RECEIVED

MAY 04 1992

NATURAL RESOURCE
DAMAGE PROGRAM

MAY 1, 1992

DEAR SIR,

On April 30, 1992 I RECEIVED THE PREASSESSMENT SCREEN AND PART 2 OF THE ASSESSMENT PLAN FOR THE CLARK FORK RIVER BASIN NPL SITES, THAT I REQUESTED. I APPRECIATE YOUR QUICK RESPONSE TO MY REQUEST. I AM ALSO IN NEED OF PART 1 OF THE ASSESSMENT PLAN WHICH WAS RELEASED IN JANUARY 1992, IF STILL AVAILABLE. I AM VERY IMPRESSED WITH THE QUALITY OF THE PARTS OF THE ASSESSMENT PLAN THAT I HAVE COME ACROSS IN MY RESEARCH THUS FAR. OF ALL THE E.P.A., ARCO, STATE OF MONTANA, AND INDEPENDANT REPORTS I HAVE RESEARCHED, THE ASSESSMENT PLANS RELEASED THROUGH THE NATURAL RESOURCE DAMAGE PROGRAM (MT. D.H.E.C.) CONTAIN THE VITAL INFORMATION I REQUIRE AND PRESENT IT IN A CLEAR CONCISE MANNER. I AM CERTAIN THAT THESE DOCUMENTS WILL PLAY A VITAL ROLE IN DETERMINING THE FUTURE OF THE CLARK FORK.

Again, if available please send Part 1 (Jan 1992) as soon as possible. THANKS FOR YOUR HELP.

SINCERELY,
PAUL CAPPSS

RECEIVED

PAUL CAPPSS

416 E 7th ST.

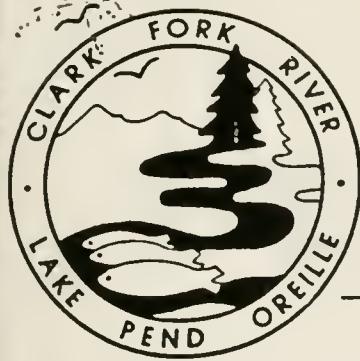
ANACONDA, MT

59711

MAY 1 1992

Montana Department
of Environmental
Solid and Hazardous

2.06.01.02



ADMINISTRATIVE RECORD

Clark Fork - Pend Oreille Coalition

P.O. Box 7593 • Missoula MT 59807 • (406) 542-0539
P.O. Box 1096 • Sandpoint ID 83864 • (208) 263-0347

29 May 1992

Dick Pederson
Natural Resources Damage Program Manager
DHES
Cogswell Building
Capitol Station
Helena, MT 59620

RECEIVED
JUN 03 1992
NATURAL RESOURCE
DAMAGE PROGRAM

Dear Dick:

The Clark Fork - Pend Oreille Coalition submits the following comments for the record for Part II of the assessment plan for the damage claim for the Clark Fork River Basin NPL sites.

We would appreciate a copy of the State's plan -- including the procedures, schedule and survey questions -- for the Contingency Valuation Method being used to assess damages to fish, wildlife and recreation. We also welcome the opportunity to talk with you regarding our comments.

Sincerely,

Bruce Farling
Bruce Farling
Conservation Director

**COMMENTS OF THE CLARK FORK - PEND OREILLE COALITION
ON PART I OF THE STATE OF MONTANA'S ASSESSMENT PLAN
FOR CLARK FORK RIVER BASIN NATIONAL PRIORITY SITES**

May 1992

Comments are referenced to pages in the plan

p. 3. Why has it been determined that the geographic focus for injury to air and wildlife should be limited to the Clark Fork watershed? Has it been determined that smelter emissions never damaged lands east of the Continental Divide, especially in the Big Hole watershed? In addition, has it been concluded that there have been no impacts to wildlife that use the Big Hole side of the divide?

p. 5. It is unclear under section 2.3.1 whether DOI rules consider an injury to have occurred if air emissions were below concentrations that might have established by the Clean Air Act or other federal and state statutes. The rules are unclear as to whether both or just one of the cited rules [Sections (d)(1) and (d)(2) of 43 CFR 11.62] have to be met before it can be determined whether an injury occurred. If standards had to have been exceeded, that means injury incurred from the cumulative effects of continued lower level releases might be discounted.

p. 6. What are the "existing data" to be used for determining injury to air?

p. 9 What criteria determine an "indicator species?"

pps. 9-10. The assessment of injury to soils and vegetation should include the floodplain down to Milltown. To stop at Garrison seems arbitrary, and it ignores injuries that are currently being studied at the Milltown NPL site. Because the plan will address injuries to wildlife and fish below Garrison, it must also examine the potential pathways of hazardous materials, including soils and vegetation.

p. 10. The plan for wildlife seems like it will avoid determining injury to many wildlife types that could very well have been affected by mining and smelting wastes. Among types not mentioned in the plan are shorebirds (ie., plovers, dowitchers, sandpipers, curlews, etc., which eat vertebrates and invertebrates in contaminated streams and wetland sites), furbearers such as beavers and muskrat, amphibians and snakes. In fact, with the exception of a few species (great blue herons, osprey, belted kingfisher), most nongame

nrdc comments -- part 2
May 1992
page 2

wildlife -- which have a documented value to society -- in the area are ignored in the plan. For example, damage to riparian habitat results in injury to neotropical migratory birds. Research indicates that more than half of the migratory birds occurring in this region use riparian habitat for nesting.

p. 12. The plan doesn't say what stage of ecological succession will be used for baseline information at the control sites? For example, will injury to upland sites be based on information from seral forest habitat at control sites? Or will it be based on later successional stages, the so called "climax" stage? Will the plan include a mix? Will it use control sites with vegetation values interpolated from historical information (ie. What might have been there had there not been a smelter, etc.)? It's important to consider that habitat suitability will differ depending on the successional stage evaluated.

p. 12. What are "grossly injured vegetation communities?"

p. 14. The plan is unclear as to what habitats will be ground truthed and which will be examined using "maps" and "aerial photographs?" Many impacts will only be apparent on the ground, therefore maps and photographs will have limited use. In addition, only on-site inspection will be reliable when attempting to discern whether impacts were from mining and smelting or from another land use.

p. 15. Information regarding location of the sampling grid for upland sites is limited. It also seems several grids should be developed if the intent is to determine injuries from upper Silver Bow Creek down to Garrison.

p. 15. Why has it been determined that 24 grid points is adequate for sampling impacted and "control" riparian and upland sites? Isn't the number of samples determined by some rough estimation of variability, such that there are enough samples available to fall within some established error limits?

p. 16. When evaluating damage in the riparian corridor of the Clark Fork River, belt transects should extend beyond 50 meters on both sides of the river -- unless there is some scientific basis for determining that the river's

nrdc comments -- part 2
May 1992
page 3

riparian zone in the last 100 years has never been located 50 meters beyond the current channel. Channel changes in the Clark Fork have resulted in tailings being deposited more than 50 meters from the current location of the river. It's possible the transects, then, will miss areas of heavy deposits and therefore composite soil samples may not fully represent the extent of the injury to the riparian zone. It's possible that contamination in old channel areas may be heavier than the area adjacent to the current channel because for years contamination in high water was not reduced as effectively as it is now at the Warm Springs Ponds.

p. 16. What is "large-scale mining?" What is the relevance of the term to the assessment plan?

p. 16. What criteria determine that soil samples for the top six inches will be adequate?

p. 17. How will vegetation be "evaluated qualitatively" for indications of suppressed vigor and overt symptoms of toxicity? Range scientists have been arguing over qualitative evaluations of vegetation for years, without a lot of consensus. How will drought stress be factored in?

p. 19-21. Without seeing more specifics on how baseline, controls, impact sites, populations and physical conditions will be determined, it is hard to tell from this assessment plan how cause and effect from metals contamination will be established for wildlife. There are simply too many other causes -- varied land uses, fire suppression, hunting, trapping, etc. -- that affect wildlife populations.

p. 19. The plan is unclear as to how vegetation community structure will be evaluated. For example the plan says: "At each site, the following data **may** (our emphasis) will be collected...." It should be determined now exactly what kind of habitat/vegetation-structure classification system will be used, and it should be consistent throughout the assessment.

p. 20. The plan says indicator species **may** (our emphasis) include: marten, blue grouse elk and mule deer. It also says riparian species **may** (our emphasis) include: white-tailed deer and mink. What is an "indicator species" for the purposes of the assessment, and what species exactly are we talking

nrdc comments -- part 2

May 1992

page 4

about? We recommend a closed-canopy songbird (say, varied thrush or ruby crowned kinglet) and a cavity dwelling bird be included with the upland sites, and perhaps moose and an amphibian included for riparian areas.

p. 20 The plan should consider an evaluation the impacts to birds that feed further down the riparian food chain. Kingfishers, osprey, bald eagles and great blue herons feed primarily on fish. Consider plovers, sandpipers, dowitchers or the curlew. In addition, the plan should examine the effects metal contamination may have on the food source, habitat or physiology of waterfowl -- especially dabbling and diving ducks.

p. 22. How will "time integrated" sampling at Silver Bow Creek, the Clark Fork River and Warms Springs Ponds supplement information already on hand from Superfund RI/FSs, the Montana Water Quality Bureau, USGS, ARCO and DFWP? Will this sampling be comparable (QA/QC, analysis techniques, etc.) to data already collected?

p. 23. Many of the surface water sampling sites have been suffering in recent years from significantly lower stream flows than their 10 -to 20 year averages. Will this affect the usefulness of the data?

p. 24. Under Task 2, what does this statement mean: "Sample collection procedures may be modified due to small size of these streams." We presume the "modifications" will not change QA/QC procedures.

p. 25. Why was Thompson Park dropped as a baseline area for groundwater samples?

p. 26. It is unclear just what rules and "guidance" this plan follows? Is "guidance" the same as a proposed rule?

p. 30. Why is the travel cost method not being applied to the wildlife damage assessment? It could apply to hunters or wildlife viewers.

p. 34. Analysis of the travel cost plan may need to allow for the confounding factor of prolonged drought years. They may have a differential effect on the value of the fishery and recreational attractiveness of the upper Clark Fork versus, say, the upper Missouri. In addition, there may be

nrdc comments -- part 2

May 1992

page 5

some differential effects that could be attributed to the Clark Fork's reputation, which has been that of a polluted stream and not an attractive fishery.

p. 39. The CVM studies are useful but they will be criticized because there may be a difference between willingness to pay and actions. Criticism could be minimized by adjusting differences based on comparative studies. Is the state using any comparative studies of willingness to pay and actual activities?

p. 39-44. Since CVM is of necessity somewhat subjective, its validity will be a measure of conclusions based on valid and acceptable assumptions, highly skilled interviews, unbiased questionnaires, and unbiased and well funded interpretation of results. We would therefore like to see, if possible, the specific CVM plans.

ADMINISTRATIVE RECORD

June 28, 1992

RECEIVED

JUL 06 1992

NATURAL RESOURCE
DAMAGE PROGRAM

Mr. Dick Pedersen
Natural Resource Damage Program Office
616 Helena Avenue
Steamboat Block, Room 209
Helena, MT 59620

Dear Sir:

This letter is in response to the Natural Resource Damage Assessment Plan - Part II that we had received for evaluation and comments over a month ago.

During our June 10th meeting a presentation outlining the Plan was made to the committee members in attendance and it was taken with mixed emotion. As a result of this reaction, we have requested you to speak to our committee at our July 8th meeting and to respond to some questions our members have.

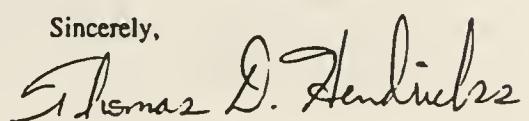
Some of the questions raised were as follows:

1. How can the "State" declare something as illegal or compensable today that was done years ago, when apparently no laws stating that the act was illegal, existed at the time. Mining practices met the laws and standards of the time, so how can the PRP(s) be held responsible for the "past"?
2. Could, or should, retired "State" officials be held responsible for laws they neglected to write that may have protected the natural resources from getting damaged in the first place?
3. What will this do to the individual miner or small mining company, if ARCO is found accountable for the past contamination or loss of a natural resource? (In essentially a lawsuit "precedence" setting situation.)
4. Could this issue be resolved without a lawsuit? An example suggested was implementing the Alternate Dispute Resolution concept, as presented at the recent Mansfield Conference that was attended and reported on to the committee by Dr. William MacGregor. (We were especially concerned that a lawsuit could possibly last for years, and thus could burn up dollars that may be better spent elsewhere.)
5. Upon EPA's completion of the area clean-up, what does the Natural Resource Damage Program plan to work towards, if the lawsuit with ARCO fails?

This gives you a quick sample of the range of questions asked by our members, and should allow you to prepare to discuss these types of questions. If you need any clarification, please call me at 496-4433.

Thank you very much for your time and we look forward to seeing you at our July 8th CTEC committee meeting which will be held at 7:00 pm in the Mt. Tech Student Union Building (SUB).

Sincerely,



Thomas D. Hendricks
CTEC - TAG Assistant



United States Department of the Interior



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 OFFICE OF ENVIRONMENTAL AFFAIRS
 DENVER FEDERAL CENTER, BUILDING 56, ROOM 1018
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 DENVER, COLORADO 80225-0007

July 1, 1992

Mr. Dick Pedersen
 Natural Resource Damage Program Manager
 Environmental Sciences Division
 Department of Health and Environmental Sciences
 Coggswell Building
 Helena, MT 59620

RECEIVED
 JUL 06 1992
 NATURAL RESOURCE
 DAMAGE PROGRAM

Dear Mr. Pedersen:

In response to your April, 1992 public notice, we have reviewed the draft Assessment Plan: Part II, Clark Fork River Basin NPL Sites, MT.

We again wish to commend the State of Montana for its continuing efforts to coordinate your natural resource damage assessment efforts with those of the other trustees for natural resources.

As noted in our March 19, 1992, comments on Part I of the Assessment Plan, there are multiple trustees for natural resources in the Clark Fork Basin - the State of Montana, the Confederated Salish and Kootenai Tribes, and the United States (both the Department of Agriculture and the Department of the Interior). During our January, 1992 meeting, we discussed the overlapping 'trusteeship' and collective responsibility of all trustees to provide for the restoration, rehabilitation, or replacement of natural resources which have been injured, lost, or destroyed as a result of releases of hazardous substances.

We recognize that the State's claim for natural resource damages was filed in 1983, and the schedule for your natural resource damage assessment has been established by court order. The United States is not a party to this litigation. Moreover, we are barred (by CERCLA Section 113(g)(1)) from commencing an action for damages until after selection of remedial actions at the various National Priority List sites along the Clark Fork River.

Consequently, it will likely be some years before we can bring our own natural resource damage action. Nonetheless, resolution of the State's litigation does not bind other trustees, nor does it constrain our independent authority to seek natural resource damages.

Although this difference in timing precludes a consolidated claim on behalf of all trustees, it is important to preserve the other trustees' opportunity for a future claim for uncompensated damages for injury, loss, or destruction of natural resources under their trusteeship.

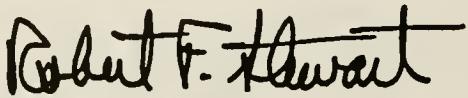
While the State's Assessment Plan does a commendable job of describing certain activities to be conducted under the Injury Determination, Quantification, and Damage Determination phases, the scope of specific natural resources to the addressed (e.g., wildlife species) is rather open-ended. Accordingly, it is unclear the extent to which the State's claim (and subsequent restoration efforts) would achieve restoration of natural resources under the co-trusteeship of the Department of the Interior.

To avoid possible future questions about "double recovery", it would be most helpful to us (as well as the other trustees) if the Assessment Plan clearly defined the limits of your claim, and explicitly excluded lands and other natural resources owned by the United States.

Enclosed are our technical comments on the Assessment Plan: Part II.

These comments are provided on a technical assistance basis only. They do not constitute a position the Department of the Interior may take regarding possible injury to, loss of, or destruction of natural resources under our trusteeship, nor possible future action on our part to recover damages for such injury, loss, or destruction. Moreover, they do not constitute participation in the State's natural resource damage assessment, and should not be construed as such.

Sincerely,



Robert F. Stewart
Regional Environmental Officer

Enclosure

cc: Field SOL/Billings, J. Chaffin
DOJ, P. Karmel
USDA/GC, K. Pitt
FWS/Denver
FWS/Helena
BIA/Portland
BLM/Billings
NPS/Denver
NPS/Grant-Kohrs Ranch
OEA/HQ

TECHNICAL COMMENTS ON THE STATE OF MONTANA'S DRAFT ASSESSMENT PLAN - CLARK FORK RIVER BASIN NPL SITES - PART II

GENERAL COMMENTS

Part II of the draft Assessment Plan describes methodologies to determine and quantify the injury to air, soils, vegetation and wildlife. It appears that these investigations are somewhat limited, both in terms of geographic extent and resources addressed.

For example, evaluation and quantification of injury to terrestrial resources (soils, vegetation, wildlife) appears to be confined to the immediate environs of Silver Bow Creek and the Clark Fork River (as far downstream as Garrison), Butte, and Anaconda. It does not appear that 'off-site' injuries, particularly from aerial deposition, are being addressed.

In addition, although the avian survey section mentions four species under the co-trusteeship of the Department of the Interior (bald eagle, osprey, great blue heron, and belted kingfisher), waterfowl and other migratory birds are not explicitly addressed in the Assessment Plan. Thus, it appears that any injury to these wildlife trust resources would have been addressed indirectly - through determination and quantification of injury to soils and vegetation, and in those areas where soil and vegetation data are collected.

Accordingly, it is unclear whether the State intends to pursue a claim for and implement subsequent restoration, replacement, or acquisition based on damages for injuries to natural resources (and geographic areas) other than those explicitly identified in the Assessment Plan. If not, it appears that damages for some natural resources under our trusteeship would remain uncompensated. To avoid possible questions about "double recovery", we suggest that the Assessment Plan clearly define the limits of your claim (e.g., identified species and specified geographic areas only), and explicitly exclude lands and other natural resources owned by the United States (e.g., Grant-Kohrs Ranch National Historic Site).

SPECIFIC COMMENTS

2.4.1.1 Definitions of Injury (page 7)

Injury to both soils and vegetation can be defined by inhibition of microbial activity, as well as phytotoxic responses. Inclusion of microbial response in the soil and vegetation injury determination phases (sections 2.4.5.1 and 2.4.5.2, respectively) would supplement the "preponderance of evidence" in claiming injury to those resources.

2.4.5.1 Soils (page 14)

We suggest that sufficiently low dry weight detection limits be utilized to ensure that all hazardous amounts can be identified.

2.4.5.2 Vegetation Methodologies (page 17)

Plants growing within impact and control areas will be sampled to determine concentrations of target metals incorporated in tissues. Soil sampling (2.4.5.1) will also be conducted at control and impact sites. These sampling efforts should be coordinated so that soil and vegetation residue analysis results from the same specific area can be compared, and the contaminant pathway documented.

We believe that the proposed phytotoxicity testing of riparian plants (page 19) using *Populus* sp. is an important part of the Plan. Very few cottonwoods grow along the upper Clark Fork River and this testing may provide evidence as to the cause of their absence.

2.4.5.3 Wildlife (page 19 ff.)

We recommend that this section be strengthened with respect to waterfowl and other migratory birds. Caging and feeding studies could be done to determine what the actual effects from ingesting contaminated food sources. This is important since the literature is not strong enough to allow predictions for probable effects.

Task 1: Injury to Birds (page 20)

This injury assessment is focused on piscivorous birds, whereas the avian resources of the Clark Fork River Basin include a much wider variety of birds. We recommend that the bird surveys be coordinated with the soil and vegetation sampling such that correlations among these variables can be determined and contaminant pathways be documented.

2.5.2 Water Samples (pages 23-24)

Sufficiently low detection limits should be utilized to ensure that all hazardous amounts are identified.

ADMINISTRATIVE RECORD

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July 1, 1992

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VIA TELEFAX

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Re: State v. ARCO
Our File No. C-4498

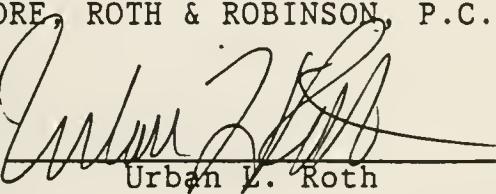
Dear Dick:

Enclosed please find a copy of Atlantic Richfield Company's Comments on the State of Montana's April 1992 "Assessment Plan: Part II, Clark Fork River Basin NPL Sites, Montana."

Very truly yours,

POORE, ROTH & ROBINSON, P.C.

By


Urban L. Roth

ULR/mla
0920701A
Enclosure

ADMINISTRATIVE RECORD

COMMENTS
OF ATLANTIC RICHFIELD COMPANY
ON THE STATE OF MONTANA'S
APRIL 1992
"ASSESSMENT PLAN: PART II
CLARK FORK RIVER BASIN NPL SITES, MONTANA"

JULY 1, 1992

SUBMITTED ON BEHALF OF
ATLANTIC RICHFIELD COMPANY
BY
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INTRODUCTION

The State of Montana has issued a 50-page document entitled "Assessment Plan: Part-II Clark Fork River Basin NPL Sites, Montana" dated April 1992, which, together with its Preassessment Screen issued in October 1991 and the Assessment Plan, Part I, in January 1992, purports to meet the requirements of the Department of the Interior regulations, 43 C.F.R. Part 11, as modified by Ohio v. Department of Interior, 880 F.2d 432(D.C. Cir. 1989), for the preassessment and assessment of natural resource damages under CERCLA. The issuance of this second phase of the Assessment Plan confirms what was signalled in the Preassessment Screen and Assessment Plan, Part I -- that the State of Montana has long since determined that surface water, fisheries, sediment, groundwater, air, soil, vegetation and wildlife resources, not specifically located or identified but stated as generally within the Clark Fork River Basin NPL sites area, have been injured from the 1880s to date by releases of hazardous substances from mining and related operations for which the State alleges ARCO may now, in the 1990s, be held responsible under CERCLA. Although the State has elected to use the U.S. Department of the Interior ("DOI") Type B damage assessment regulations to establish injury to those natural resources, the State's Assessment Plan, including this most recently issued Part II, in no respect meets the requirements of those regulations but, rather, simply recites the applicable provisions, asserting compliance and wholly failing to fulfill in any complete or

substantive way the mandates of that regulatory scheme or, indeed, the statutory framework of CERCLA in which the regulations must be read.

Thus, for example, the Preassessment Screen and Assessment Plan, Parts I and II, wholly fail to address statutory and regulatory considerations relating to the scope and type of natural resource injuries which must be excluded from any assessment of natural resources damages such as the pre-enactment release bar set forth in CERCLA § 107(f)(1) and required to be considered by 43 C.F.R. § 11.24(b)(1)(ii), permitted releases (CERCLA § 107(j); 43 C.F.R. § 11.24(b)(1)(iv)), and releases specifically identified as an irreversible and irretrievable commitment of natural resources (CERCLA § 107(f)(1); 43 C.F.R. § 11.24(b)(1)(i)). The Plan, Parts I and II, provides no mechanism for identifying natural resource injury caused by natural phenomena or human activities other than copper mining in the Clark Fork River Basin NPL sites area. For example, it is widely recognized and has been commented on by the State that agriculture, cattle grazing, stream dewatering, urbanization, road building, river channelization and the cumulative effects of other industrial activities cause injury to natural resources. Thus, damages assessed attributable to those activities must be identified and accounted for in any damage assessment.

The Plan fails to describe in any sufficient way any of the natural resources in question. It also fails even to attempt to delineate between private and public resources and, as to the

latter, between resources which fall under federal jurisdiction as opposed to that of the State of Montana.

Part II of the Assessment Plan, like Part I, simply recites the DOI regulations concerning pathway determination and definition of injury for the various types of resources and offers wholly inadequate research plans for the determination and quantification of injury. No aspect of these sections of Part II satisfies in any meaningful or substantive way the DOI regulations.

Section 3.0 of Part II, which purports to estimate natural recovery periods, an exercise critical to developing appropriate and reliable methodologies for restoration and lost use damages, fails to consider recovery in any terms other than persistence of metals. In addition, the Plan fails to consider recovery in terms of services, methodologies for evaluating the recovery of services or the current and available data on recovery of services, as is required by both current and proposed DOI regulations. However, perhaps the most significant aspects of this essential part of the Assessment Plan are its acknowledgement that the remedial investigation and feasibility study process, a required predicate for any restoration or lost use damage determination, ". . . will not be complete for at least another decade . . ." (AP, II at 27) and its wholly unfounded and speculative preliminary estimate that ". . . natural recovery periods for injured resources of the Clark Fort

River Basin may be on the order of centuries, if not millennia (AP, II at 27)."

Finally, the Assessment Plan's economic methodology, set forth in section 4.0 of Part II, has serious deficiencies which will allow double-counting, expressly prohibited by CERCLA § 107(f)(1), and, standing alone, will lead to an unreliable and invalid damage assessment. The lack of information with respect to potentially injured resources and services has apparently prevented the State from making a preliminary estimate of damages and from preparing a Restoration and Compensation Determination Plan as required by the regulations. Moreover, the Plan fails to consider in any meaningful way the very real issues concerning technical feasibility and cost/benefit proportion necessarily raised in connection with exploring restoration of natural resources in such an allegedly large and undefined site as this. The Plan's proposed methodologies for determining lost use damages are also deficient. And the one non-use contingent valuation study proposed is worthless. The State must withdraw and entirely rework the flawed economic methodology presented in Part II.

Faced with the regulatory requirement of preparing an Assessment Plan, the State has set about to satisfy that requirement with what it obviously views as merely a piece of necessary paperwork. In so doing, the State simply parrots the regulatory requirements without providing the necessary substance to enable an informed and intelligent evaluation of the Plan.

The State has provided no basis by which to evaluate the validity of its plan to assess natural resource damages. The State does not identify which resources or services have been allegedly injured. Moreover, the State does not even identify a baseline or time line to which resources can be compared to determine whether in fact the resources have been injured and, if so, by how much.

The State has taken this superficial approach from the beginning of the assessment process. The numerous fundamental deficiencies of the Preassessment Screen, such as the failure adequately to identify the natural resources at issue, have become systemic problems which neither part of the Assessment Plan has cured or even addressed. Each step of the assessment process necessarily builds on those that precede it. The failings of the Preassessment Screen reoccur in the Assessment Plan and, combined with the State's failure to satisfy the DOI regulations relating to development of an assessment plan, fatally compromise this Plan and will render any damage assessment it produces meaningless.

I. LEGAL COMMENTS.

- A. The State Of Montana's Assessment Plan Fails To Exclude From The Natural Resources Assessment Damages Excluded From Liability Under CERCLA.

A threshold and fundamental flaw in the Assessment Plan, which has already been noted with respect to the Preassessment Screen, is that the Plan fails to exclude from the proposed assessment those natural resource damages for which there can be

no liability under CERCLA. Nowhere in the Plan does the State take into account the numerous limitations on its ability to recover damages, however measured, from ARCO for any injury to or loss or destruction of any natural resource caused by a release of any hazardous substance.

The DOI regulations, consistent with CERCLA, require that the State of Montana exclude from any assessment damages "[r]esulting from . . . [a] release . . . specifically identified as an irreversible and irretrievable commitment of natural resources in an environmental impact statement or other comparable environmental analysis . . ." (43 C.F.R. § 11.24(b)(1)(i); CERCLA § 107(f)(1)), damages where the releases from which the damages allegedly resulted occurred wholly before December 11, 1980, i.e., the enactment date of CERCLA (43 C.F.R. § 11.24(b)(1)(ii); CERCLA § 107(f)(1)), and damages resulting from any federally permitted release (43 C.F.R. § 11.24(b)(1)(iv); CERCLA § 107(j)). The regulations essentially require the State to determine whether such excluded damages are involved and, if so, that they are excluded from the assessment. The burden is on the State of Montana to identify any such damages. This necessarily requires the State, in its assessment, to identify resources and services injury which, if any, would give rise to such damages, and to eliminate them from the scope of any damage assessment.

Similarly, the State's Assessment Plan makes no attempt to identify -- either to exclude from the assessment or in order to

develop an appropriate division of damages -- any injuries to any natural resource (i) caused by any natural phenomena which would be excluded from liability under CERCLA §107(b)(1), (ii) caused by operations pursuant to contracts or other arrangements with the United States excluded from liability under CERCLA § 107(b)(2), (iii) caused by the historical copper mining activities of persons other than ARCO or by activities other than copper mining in the Clark Fork River Basin such as human settlements, agriculture, cattle grazing, road building, river channelization, stream dewatering, urbanization and the cumulative effects of other industrial activities, all of which are excluded from liability under CERCLA § 107(b)(3) and applicable common law.

Moreover, the Assessment Plan neither identifies nor excepts from the assessment any natural resource injury caused by releases from activities permitted by the State of Montana, such as from the Warm Springs Ponds. Nor does the Plan attempt to identify and exclude from the assessment any natural resource injury caused by a release of any naturally occurring substance. See CERCLA § 104(a)(3).

As is clear from both Parts I and II of the Assessment Plan, the State of Montana intends to perform a damage assessment for the period of the 1880s to date over a vast geographic area which is so mineral rich that metals naturally occur, which has experienced major natural phenomena in this period, primarily extreme flooding, and which has undergone significant development

wholly apart from the impact of copper mining. Moreover, with respect to the copper mining and related activities that have taken place in the Clark Fork River Basin in the period in question, the State of Montana has itself been so involved with the industry and has so supported the industry that ARCO is defending the State's natural resource damages action on the ground, among others, that any damages resulting from hazardous substances released in the course of copper mining and related activities constitute an irreversible and irretrievable commitment of natural resources. Under CERCLA, the relevant DOI regulations and other applicable legal principles, the State is obliged to identify releases which are not actionable and exclude them from the assessment process or to provide a methodology for apportioning damages for such releases so that they can be excluded from the damage assessment. The Assessment Plan fails to do either.

The most egregious example of the State's total oversight of these exclusions from or set-offs against claimed natural resource damages is the State's failure even to acknowledge the applicability of the pre-enactment damages bar mandated to be considered by 43 C.F.R. § 11.24(b)(1)(ii) and (2). See also CERCLA § 107(f)(1). Those provisions of the regulations require that a natural resource damage assessment not include damages from releases of hazardous substances which occurred before the enactment of CERCLA (December 11, 1980). Although the State makes clear that it intends to perform a damage assessment for a

period beginning in the 1880s, the State offers no methodology identifying how it will apportion and exclude from the assessment all pre-December 11, 1980, resource injuries and alleged resultant damages. Indeed, the State does not even mention the issue. This flagrant violation of the law will fatally compromise the damage assessment.

B. The Assessment Plan Fails Adequately To Identify Natural Resources At Issue In The State Of Montana's Proposed Assessment, Blurs The Critical Distinction Between Public And Private Resources And Makes It Impossible To Sort Out Trustee Jurisdiction Of Public Resources.

A second and equally fundamental deficiency of the State of Montana's Assessment Plan is its failure to identify in any adequate or sufficient way the natural resources which the State contends have been injured by releases of hazardous substances from mining activities for which the State seeks to hold ARCO responsible. This basic omission not only violates the requirements of the DOI regulations that those natural resources be identified, it also means that the Plan fails to delineate between public and private resources and, further, that, as to public resources, the Plan does not identify those public resources for which the State may be authorized to act as trustee and those which are subject to the jurisdiction of the federal government which, under the DOI regulations, must take the lead role.

The requirements of the DOI regulations that the State identify the natural resources in question and the basis for its trusteeship be identified and declared are interrelated and are

clear. Section 11.23(e)(2) of 43 C.F.R. provides that, based on information gathered in the preassessment screen process and before proceeding with an assessment, the State must determine that natural resources for which it ". . . may assert trusteeship". . . ". . . have been or are likely to have been adversely affected by the . . . release . . .". In order to fulfill those criteria for proceeding with an assessment, the State of Montana was required to but failed to identify the resources in question so that this implied status as public, as opposed to private resources, might be confirmed and the bases for its asserted trusteeship over each specific resource might be determined. Further, 43 C.F.R. § 11.25(e) mandates that the preassessment screen must also ". . . identify natural resources for which . . . [the trustee] may assert trusteeship that are potentially affected . . .", i.e., identify the type of resources in question and the geographic location or other relevant aspect of each type of resource or particular resource which provides the basis for the State's trusteeship jurisdiction. Again, as has been noted, the Preassessment Screen included no such information.

With respect to the content of an assessment plan, 43 C.F.R. § 11.31(a)(2) unequivocally requires that "[t]he Assessment Plan shall include descriptions of the natural resources and the geographic areas involved." Moreover, 43 C.F.R. § 11.32, which addresses the development of an assessment plan and, specifically, the coordination of assessment efforts between

various authorities that may be trustees under CERCLA, requires the identification and involvement of potentially responsible parties and public involvement in the assessment plan. That section also requires as a threshold condition for the satisfaction or implementation of its provisions that natural resources be sufficiently identified so that all state and federal agencies which may possibly be involved or any Indian tribes which may possibly be involved can know what natural resources are at issue and where they are located for purposes of jointly determining and coordinating assessment efforts. This requirement further ensures that all possible potentially responsible parties may participate in and so that the public may be able to comment on the proposed assessment plan and participate in the proposed assessment on some informed and intelligent basis.

However, the descriptions of the natural resources which are the subject of the Assessment Plan, Part II¹ wholly fail to identify the resources sufficiently so that it can be determined whether they are public or private and what authority is the appropriate trustee. For example, the descriptions of air resources to be assessed set forth in section 6.6 of Part I and section 2.3.2 of Part II actually do not describe the air resources in question but, rather, identify the alleged sources of injury to those air resources. Thus, ". . . smelter emissions

¹ The deficiencies of this aspect of the Assessment Plan, Part I have already been commented upon.

from the Butte and Anaconda Smelter facilities . . ." containing ". . . elevated concentrations of hazardous substances" are identified as are ". . . widespread distribution of unconfined tailings and waste piles . . .". AP, II at 5. The remainder of the description involves "areas affected" which appear to be geographic areas of impact rather than air resources and are described as ". . . Smelter Hill and adjacent uplands in the vicinity of Anaconda, the Deer Lodge Valley, areas downwind of the Yankee Doodle Tailings near Butte, the Colorado Tailings, the Opportunity Ponds, and in the vicinity of tailings deposits along Silver Bow Creek and the Clark Fork River." AP, II at 5. The State concludes its description of air resources to be assessed with the statement:

The State will focus on areas affected by hazardous substances released from facilities near Anaconda and Butte during periods of operation and continuing through demolition to the present. Injury assessment will also include that resulting from transport via windblown fugitive dust from unconfined waste piles and fluvially deposited slickens containing hazardous substances.

AP, II at 5.

The description of soils resources to be assessed is similarly inadequate and, again, focuses less on the identification of the resources than on the methods by which the State is alleging that the soils became contaminated. Soils resources are described as ". . . soil throughout the upper Clark Fork River Basin containing elevated levels of metals relative to

background concentrations." AP, II at 9. The description continues in a statement of the focus of the assessment:

The State's assessment of injury to soils will concentrate on those areas of greatest injury to riparian and upland soils attributable to releases of hazardous substances. Injured riparian areas include Silver Bow Creek, the Warm Springs Ponds, the Upper Clark Fork River from approximately Warm Springs Ponds to Garrison, and the Opportunity Ponds and adjacent lands. Injured upland areas include Smelter Hill and adjacent uplands, and Yankee Doodle Tailings and adjacent mine dumps and leach pads in the Butte area.

AP, II at 9. While giving some general geographic reference, this description does not sufficiently identify or locate either the riparian or upland areas in question. Except for the Warm Springs Ponds themselves which are owned by ARCO, no area is sufficiently identified so that its ownership can be determined.

The Assessment Plan's description of vegetation resources allegedly injured and subject to assessment is equally deficient, and, as with the descriptions of air resources and soils resources, the description of vegetation resources is largely a discussion of the sources of alleged contaminants. The description of vegetation resources to be assessed appears to include vegetation that is or might have been in "[f]lood plain soils and bank sediments on Silver Bow Creek from Butte to Warm Springs Ponds, the Warm Springs Ponds and the Clark Fork River from Warm Springs Ponds to Garrison, the Anaconda and Opportunity Ponds, and the Yankee Doodle Tailings . . ." and "[upland] soil surrounding Smelter Hill . . .". AP, II at 9. The State

summarizes its description of vegetation resources to be assessed with the statement:

The State's assessment of injury to vegetation resources will concentrate on upland areas near the cities of Anaconda and Butte, and riparian areas along Silver Bow Creek from approximately Butte to Warm Springs Ponds, the Upper Clark Fork River from approximately Warm Springs Ponds to Garrison, and the Opportunity lowlands.

AP, II at 10. Neither in section 2.4.2.2 of Part II of the Plan nor at any other place in Parts I or II does the State describe the vegetation resources which are allegedly injured and to be assessed in any manner sufficient to locate the resource geographically so as to determine which are public and which private and as to the former what authority is the appropriate trustee.

The Assessment Plan's description of wildlife resources in section 2.4.2.3 of Part II of the Plan is no better. The "description" is again largely a summary of the sources of hazardous substances to which the wildlife resources allegedly have been exposed and the paths of exposure. Two geographic areas are generally described and a number of wildlife species are identified. The Plan states that in the "upper Clark Fork drainage" otter, mink, raccoons, muskrats, bald eagle, osprey, great blue herring, belted kingfisher have potentially been exposed and that white tail deer along Silver Bow Creek and the Clark Fork River and elk, blue grouse, mule deer and pine marten in upland forest and forest-edge plant communities surrounding Smelter Hill have potentially been injured. AP, II at 10.

Again, this is a wholly inadequate description of wildlife resources and provides no basis for an identification of particular wildlife resources so as to determine what authority, if any, is the appropriate trustee.

The complete and comprehensive failure of the State to identify the natural resources which are the subject of its proposed assessment violates the cited requirements of the DOI regulations and is alone reason for the State to withdraw and revise the Plan. However, an equally fatal deficiency is the Plan's failure to delineate public resources from private. The general, indeed sweeping, geographic references for the resources involved plainly encompass privately owned, held and managed resources. The Warm Springs Ponds are, for one example, owned by ARCO, and while some of that area is currently subject to a lease from ARCO to the State, much of the area is not. Moreover, a great deal of the land in the various geographic areas generally referenced in the Plan's resource descriptions is privately held. Simply stated, it is undisputed that neither the State nor any other authority may recover natural resource damages for injury to any private resource. See CERCLA §§ 107(a)(C) and 101(16). See also State of Ohio v. U.S. Department of Interior, 880 F.2d 432, 459-461 (D.C. Cir. 1989). Thus, there is neither warrant nor justification for the scope of the natural resources that will apparently fall within the State's assessment. If there is no identification of private resources and exclusion of them from

the assessment process, the damage assessment will be unlawful and worthless.

Finally, the failure of the State sufficiently to describe, locate or otherwise identify the natural resources in question will without doubt result in the Assessment Plan including public resources for which the State is not the authorized trustee. This not only violates the "lead trustee" requirement of 43 C.F.R. § 11.32(a)(1) but also creates the potential for double counting which is prohibited by CERCLA § 107(f)(1).

The DOI regulations recognize that, in many cases, federal and/or state agencies' interests in a natural resource are coexisting, contiguous, or concurrent. 43 C.F.R.

§ 11.32(a)(1)(i). Where such overlapping jurisdictional interests occur, "[a]uthorized officials from different agencies or Indian tribes are encouraged to cooperate and coordinate any assessments that involve coexisting or contiguous natural resources or concurrent jurisdiction." 43 C.F.R. § 11.32 (a)(1)(ii). See also 43 C.F.R. § 11.32(a)(1)(iii).

Further, "[w]hen the natural resources being assessed are located on lands or waters subject to the administrative jurisdiction of a federal agency, a designated official of the federal agency shall act as the lead authorized official." 43 C.F.R. § 11.32(a)(1)(ii)(B). A state shall act as the lead authorized official natural resource trustee only where the natural resource is not subject to a claim of trusteeship by a federal agency or Indian tribe. 43 C.F.R. § 11.32(a)(1)(ii)(D).

Several federal agencies may claim (a claim ARCO may contest) independent, coexisting, contiguous, overlapping and/or concurrent administrative jurisdiction over certain lands, waters and/or natural resources within the Clark Fork River Basin. For example,

- a) U.S. Fish and Wildlife Service, DOI -- wildlife, fish, vegetation, water and soil;
- b) National Park Service, DOI -- wildlife, fish, vegetation, water and soil;
- c) Bureau of Land Management, DOI -- wildlife, fish, vegetation, water and soil;
- d) Soil Conservation Service, Dept. of Agriculture -- water and soil;
- e) Agricultural Stabilization, Conservation Service, Dept. of Agriculture -- vegetation, water and soil;
- f) National Forest Service, Dept. of Agriculture -- wildlife, fish, vegetation, water and soil.

Moreover, both the U.S. Department of the Interior and the U.S. Department of Agriculture (or agencies/bureaus within their respective jurisdictions) have asserted and have made claim for certain specific water rights for those lands and/or natural resources which belong to, are managed by, are held in trust by, appertain to, or are otherwise controlled by the respective Departments within the Clark Fork River Basin.

~~To the extent that natural resources within the State's proposed assessment and for which it claims to be trustee fall~~

within the jurisdiction of a federal agency, the federal agency is directed to take the lead. 43 C.F.R. § 11.32(a)(1)(ii)(B). Thus, any attempt by the State to take the lead over lands and/or natural resources which belong to, are managed by, are held in trust by, appertain to, or are otherwise controlled by federal agencies would create a jurisdictional conflict between the State and appropriate federal agencies.

However, as with ARCO's concern for a delineation between public and private resources, the State's failure adequately to identify the natural resources to be assessed makes it impossible to determine what authority is the appropriate trustee for any public resource involved.

C. The State of Montana's Assessment Plan Is Not In Compliance With The Requirements Of The Regulations Regarding Natural Resource Damage Assessments, 43 C.F.R. §§ 11.30-11.35.

1. State Has Failed To Develop An Assessment Plan That Ensures That The Assessment Will Be Performed In A Planned And Systematic Manner And That Methodologies Selected Can Be Conducted At Reasonable Cost.

Before initiating any assessment, the State must develop an assessment plan. 43 C.F.R. § 11.30(a). The purpose of the assessment plan is to "ensure that the assessment is performed in a planned and systematic manner and that methodologies selected . . . can be conducted at a reasonable cost . . ." 43 C.F.R. § 11.30(b). Thus, the assessment plan is intended to provide a detailed blueprint of the actions that will be undertaken in the assessment. The State, however, has provided only general, almost generic, descriptions of some of its plans, has failed to

address key aspects of the assessment, and has postponed still other decisions until a later time. Moreover, the Assessment Plan is so incomplete and inadequate that it is impossible to determine whether the costs to be incurred by the State in implementing the Plan constitute reasonable and necessary costs and whether the assessment can be completed in a cost-effective manner at reasonable cost, as is required by 43 C.F.R. § 11.30(c)(2).

- a. Plan Fails To Identify And Document The Use Of All Scientific And Economic Methodologies That Are Expected To Be Performed.

Section 11.31 of 43 C.F.R. sets forth the required content of the Assessment Plan. Section 11.31(a)(1) provides that the Assessment Plan "shall identify and document the use of all of the scientific and economic methodologies that are expected to be performed during the Injury Determination, Quantification, and Damage Determination phases of the type B assessment" 43 C.F.R. § 11.31(a)(1). The comments elaborate further:

All decisions on the selection of the methodologies, including but not limited to, parameter values and other assumptions used to implement the methodologies provided in subparts D or E, must be documented. This documentation must be set out in the Assessment Plan.

51 F.R. 27678. (Emphasis added.)

In short, the State's plans for its assessment must disclose precisely how it will go about the injury determination, quantification, and damage determination phases so that the merits of the plan may be evaluated in advance of any incurred costs. But instead of full disclosure of its plans as to Part II

resources, the State's cursory and/or non-existent documentation of these decisions in its Assessment Plan makes a sham of the regulations. Thus, the State has failed to satisfy these regulations and may not proceed with the assessment.

(1) Plan Fails To Identify Scientific Methodologies.

The State's entire treatment of injury determination and quantification for the Part II resources is totally inadequate with obvious and enormous gaps in the areas it purports to cover. For example, the entire discussion of pathway determination fills approximately one page, is virtually entirely a recital of the regulations and does not even mention, let alone choose the scientific methodologies by which it will determine exposure pathways. The section on "Source Identification" is, if possible, even scantier, consisting of only 9 lines. Apparently in response to ARCO's comments on Part I, the State no longer states what it "may" do to identify sources of hazardous substances. Worse, it completely ducks making this determination and defers it to the assessment itself: "[s]ources of hazardous substances to which [resources] have been exposed will be identified as part of the assessment." AP, II at 3. The separate sections on each of the Part II resources are wholly inadequate, with virtually no planning for air resources and not much more for terrestrial resources.

(a) Plan Fails To Identify Methodologies For Pathway Determination.

In its assessment the State must make determinations as to each suspected pathway or route through which the hazardous substance is or was transported from the source of the release to the injured resource. 43 C.F.R. § 11.61(c)(3). Section 11.63 sets forth several basic considerations to determine the exposure pathways of the hazardous substance, and it also provides extensive guidance on the scientific methods for making the required determinations as to the various pathways. The guidance is not optional. Under § 11.61(c)(3), "the authorized official shall follow the guidance provided in the pathway section, § 11.63 of this part, to determine" the exposure pathways. 43 C.F.R. § 11.61(c)(3) (emphasis added).

The State's Assessment Plan fails entirely to discuss the basic requirements for determining the exposure pathway, and it also fails to identify or document the scientific methodologies it will use in making its determinations.

The State lists all potential pathways generically as "relevant" to "potentially injured resources" without specifying either any particular pathway or any particular resource. AP, II at 4. The State also claims it will determine that the various generic pathways have been exposed to hazardous substances, but the Plan wholly fails to address the basic requirements for the study of each suspected pathway, set forth in § 11.63(a) as follows:

----- (a) General. (1) To determine the exposure pathways of the . . . hazardous substance, the following shall be considered:

(i) The chemical and physical characteristics of the . . . released hazardous substance when transported by natural processes or while present in natural media;

(ii) The rate or mechanism of transport by natural processes of the . . . released hazardous substance; and

(iii) Combinations of pathways that, when viewed together, may transport the . . . released hazardous substance to the resource.

43 C.F.R. § 11.63(a) (emphasis added).

Not only are the basic requirements ignored in the Assessment Plan, the Plan also overlooks the specific guidance with respect to whether a particular suspected pathway in fact served as an exposure pathway for injury to the resource. See, e.g., 43 C.F.R. § 11.63(b)(1).

With regard to an air pathway as a suspected exposure pathway, the regulations state the scientific determinations that must be made. However, the Assessment Plan fails to identify how it will comply with the regulations. For example, the State indicates that it "will quantify the areal and temporal extent of injured air resources in exposed areas." AP, II at 6. The State, however, does not indicate whether, in doing so, it will consider the following factors for each release and, if so, how:

(i) The manner and nature in which the discharge or release occurs, including the duration of the emissions, amount of the discharge or release, and emergency or other time critical factors;

(ii) The configuration of the emitting source, including sources such as ponds, lagoons, pools, puddles, land and water surface spills, and venting from containers and vessels;

(iii) Physical and chemical properties of substances discharged or released, including volatility, toxicity, solubility, and physical state;

(iv) The deposition from the air and re-emission to the are of gaseous and particulate emissions; and

(v) Air transport and dispersion factors, including wind speed and direction, and atmospheric stability and temperature.

43 C.F.R. § 11.63(d)(5). The State also ignores the additional suggestion in § 11.63(d)(3) that it use available information or, as necessary, data from additional tests to estimate the areal extent of exposure and the duration and frequency of exposure of such areas to the emissions from the release of a hazardous substance. The areal extent of the exposure is defined by the regulations as the "geographicāl surface area or space where emissions from the source of discharge or release are found or otherwise determined to be present for such duration and frequency as to potentially result in injury to resources present within the area or space." 43 C.F.R. § 11.63(d)(3)(ii). Nowhere in the Assessment does the State indicate that these factors will be considered.

Thus, in the case of one category of potential exposure pathway -- air -- the State has given no consideration to the determinations it must make, including the scientific methodologies by which it will make them.

Extensive guidance is similarly provided in the regulations for determinations as to the potential surface water pathway (43 C.F.R. § 11.63(b)(1)-(5)), ground water pathway (43 C.F.R.

11.63(c)(1)(5)), geologic pathway (43 C.F.R. § 11.63(e)(1)-(2)), and biological pathway (43 C.F.R. § 11.63(f)(1)-(6)). And similarly, though the State baldly asserts each of these as "relevant" pathways, the Assessment Plan does not purport to follow any of the guidance or indicate the methodologies by which it will comply with the regulatory requirements.

(b) Plan Fails To Define And List Objectives For Testing And Sampling.

The applicable regulations provide:

Before selecting methodologies, the objectives to be achieved by testing and sampling shall be defined. These objectives shall be listed in the Assessment Plan.

43 C.F.R. § 11.64(a)(2). The Assessment Plan does contain a short section (one paragraph) entitled "Objectives of Research Plan" for each of the Part II resources. The State's listed "objectives" do not satisfy the regulation, however, because (1) they are not objectives of any testing and sampling plans, and (2) they do not take into consideration the matters listed in § 11.64(a)(2). Section 11.64(a)(2) states, in part:

In developing these objectives, the availability of information from response actions relating to the discharge or release, the resource exposed, the characteristics of the . . . hazardous substance, potential physical, chemical, or biological reactions initiated by the discharge or release, the potential injury, the pathway of exposure, and the potential for injury resulting from that pathway should be considered.

43 C.F.R. § 11.64(a)(2).

The State's objectives, by contrast, do not take into account any such specific information. Instead, they consist of

hopelessly vague aspirations such as "determine the temporal and spatial extent of injury to air resources of the upper Clark Fork Basin based on differences from baseline concentrations of hazardous substances." AP, II at 6. The Plan's failure to comply with the express mandate of § 11.64(a)(2) must be corrected before the State may proceed with the assessment.

(c) Plan Fails To Identify Methodologies For Injury Determination Phase.

The regulatory requirements for the injury determination phase are set forth at 43 C.F.R. §§ 11.61 - 11.64, and most are completely ignored by the State in its cursory treatment of injury determination for the Part II resources. Under § 11.31(a)(1), the State is required in the Assessment Plan to "identify and document the use of all the scientific methodologies that are expected to be performed during the Injury Determination [Phase]." 43 C.F.R. § 11.31(a)(1). The State has failed to comply with this requirement.

With respect to air resources, the Plan fails to identify a single scientific methodology to be performed. Aside from noting generally that injury determination "most likely will be based on existing data," AP, II at 6, the State gives no indication of any specific plans to determine injury to air resources. Indeed, in a general way, the Plan discusses steps the State "may" take, such as "[d]etermine baseline concentrations of hazardous substances at control sites." Id. In fact, that step is mandatory. The Assessment Plan must set forth how it plans to

accomplish the step rather than speculate whether it will agree to do so.

The Plan similarly fails to identify methodologies for injury determination for soils and vegetation. For example, only one methodology for injury determination for wildlife resources is identified.

(d) Plan Fails To Identify Methodologies For Quantification Phase.

The regulatory requirements for the quantification phase of an assessment are set forth in §§ 11.70 - 11.73. The "Injury Quantification" sections of the Plan on air and biological resources amount to a single sentence indicating only that the State will quantify the extent of injured resources in exposed areas relative to control areas.

The Plan's "Injury Quantification" sections on soil and vegetation are somewhat more detailed, but nevertheless completely fail to satisfy the regulations. These sections merely describe some of the sampling that the State plans to perform. The Quantification Phase, however, requires much more than sampling. The State provides no information as to whether it will comply with these requirements.

The Plan does not indicate whether the State will:

(1) Measure the extent to which the injury demonstrated in the Injury Determination phase has occurred in the assessment area;

(2) Measure the extent to which the injured resource differs from baseline conditions . . . to determine change attributable to the discharge or release;

(3) Determine services normally produced by the injured resource, which are considered the baseline services or the without-a-discharge-or-release condition . . . ;

(4) Identify interdependent services to avoid double counting in the Damage Determination phase and to discover significant secondary services that may have been disrupted by the injury; and

(5) Measure the disruption of services resulting from the discharge or release, which is considered the change in services or the with-a-discharge-or-release condition.

43 C.F.R. § 11.70(b).

Nor does the Plan indicate whether the methodology for quantifying specific resources or services will be based upon the following factors:

(1) Degree to which a particular resource or service is affected by the discharge or release;

(2) Degree to which a given resource or service can be used to represent a broad range of related resources or services;

(3) Consistency of the measurement with the requirements of the economic methodology to be used;

(4) Technical feasibility . . . of quantifying changes in a given resource or service at reasonable cost; and

(5) Preliminary estimates of services at the assessment area and control area based on resource inventory techniques.

43 C.F.R. § 11.70(d). Without this information, the Assessment Plan as it stands is insufficient, and, of course, it is impossible for ARCO to evaluate the Quantification Phase of the Plan.

(2) Plan's Proposed Economic Methodologies Are Fatally Deficient.

(a) Speculative And Unsupported Estimates And Conclusions Compromise Methodology.

From the fundamental to the specific virtually every element of the economic methodology described in the Assessment Plan is founded upon or constitutes rank speculation or wholly unsupported supposition. Thus, any quantification of natural resource damages developed in the State of Montana's damage assessment based on this methodology will not, for this reason as well as many others, qualify as any remotely accurate or otherwise reliable statement of compensatory damages for any natural resource injury in the Clark Fork River Basin.

Under CERCLA, two basic propositions relating to damages are clear: First, there can be no double recovery for clean-up and remediation costs and for natural resource damages (CERCLA § 107(f)(1)). Thus, 43 C.F.R. § 11.84(c)(2) provides that:

Natural resource damages are the residual to be determined by incorporating the effects, or anticipated effects, of any response actions. To avoid one aspect of double counting, the effects of response actions shall be factored into the analysis of damages. If response actions will not be completed until after the assessment has been initiated, the anticipated effects of such actions should be included in the assessment.

Second, the damages provided for in CERCLA § 107(a)(C) are compensatory damages and must be determined in the damage assessment with the same degree of specificity and certainty as is required of any damage determination to avoid being struck as damages. Neither CERCLA § 107(a)(C) nor any other section of the statute permits speculative damages. Further, the DOI

regulations, 43 C.F.R. § 11.13(e)(3) "Damage Determinations Phase", speak in terms of establishing ". . . the appropriate compensation expressed as a dollar amount for the injuries established in the Injury Determination phase and measured in the Quantification phase." In addition, 43 C.F.R. § 11.13(f) refers to post-assessment steps that provide for ". . . the manner in which the demand for sum certain shall be presented to a responsible party and steps to be taken when sums are awarded as damages." (emphasis added). See also 43 C.F.R. §§ 11.80(b) ("Damage Determination is to estimate the amount of money to be sought for compensation for injury to natural resources . . .") and 11.91(a). See also, e.g., Maheu v. Hughes Tool Co., 569 F.2d 459, 474-477 (9th Cir. 1978) ("'The Plaintiff is not required to prove with mathematical certainty the amount of its damage . . . [b]ut this does not mean that the door is open to present to a jury the kind of rampant speculation that went to the jury in this case.'" Id. at 476).

In light of these principles, the lack of any completed or even nearly completed RI/FS process for the Clark Fork River Basin by definition means that the first and essential component of the damage determination process -- an idea of response actions and remediation so that any residual natural resource injury may be identified or estimated on an informed basis --is absent. Thus, any damage determination developed in this damage assessment will be entirely speculative.

As has been noted, the State has in no substantive or meaningful way connected the RI/FS process and its progress to date to the State's damage assessment. Section 3.0 of Part II of the Assessment Plan reveals the reason for the State's inability to comply with 43 C.F.R. § 11.23(e)(5) and, in any substantive way, to address the remediation process -- "[r]emedies selected in the RI/FS process will not be complete for at least another decade . . .". AP, II at 27. Without knowledge of the remedies to be selected for the Clark Fork River Basin area and a fairly certain understanding of their effect on natural resources, it is simply not possible for the State to develop any useful or valid economic methodology.

The DOI regulations do provide for "uncertainty". See 43 C.F.R. § 11.84(d). However, the regulations concerning how to deal with ". . . significant uncertainties concerning the assumptions made in all phases of the assessment process . . ." (43 C.F.R. § 11.84(d)(1)) require the use of reasonable assumptions and probability estimates which themselves by definition require some level of certain parameters and reliable information. 43 C.F.R. § 11.84(d)(1) and (2). The Assessment Plan presents no bases for any assumptions or for any probability estimates that could possibly support the estimates appearing in virtually every step of the State's economic methodology and upon which the methodology is built. Rather, those estimates appear to be the product of blatant speculation taking off from unfounded and unwarranted assumptions and supposition. Sections

3.0 and 4.0 of Part II of the Assessment Plan make clear that the proposed methodology will fail to produce any either precise or reasonably estimated "sum certain" as is required for compensatory damages. Rather, the economic methodology guarantees an assessment of damages that is little better than unfettered speculation clothed in the rubric of various economic methodologies.

Perhaps the best example of the speculative basis for the State's approach is the patent and unbridled speculation concerning the periods for natural recovery of the allegedly injured resources of the Clark Fork River Basin. See Ap, II at 27. The failure of the State to consider three of the four criteria and the total absence of any even marginly informed basis for the estimated periods for natural recovery render the State's useless conclusion -- "on the order of centuries, if not millennia" (AP, II at 27) -- invalid and a nullity for purposes of damage determination. Similarly, the State's equally loose, if not wild, approach to estimating compensable values has no foundation. The methodology for determining restoration cost also hinges on assumptions and unsupported estimates concerning, for example, ". . . the likely range of RI/FS remediation actions . . ." (AP, II at 31) and cost estimates. Indeed, the Plan states

The cost estimates will be "order-of-magnitude" costs. Areal units of cost estimates may vary. For example, wetlands restriction may be estimated on costs per acre, while river bed restoration may be

based on cost per mile or costs per cubic yard per mile of sediment dredged and hauled.

AP, II at 32-33. Further, the recreation demand models described at section 4.3.3.2(a) of the Plan are simply estimate built upon estimate built upon uncertainties and assumptions. See e.g., the description of the model -- "[r]ecreational demand models (including TCM) are used to estimate values of a site's recreational services by estimating the money and the costs incurred in travelling to and from the site, and while at the recreational site . . ." (AP, II at 34) -- and of what it will do -- "[s]pecifically address and isolate other important site characteristics that may influence site choice and economic damages (AP, II at 36)."

This is hardly the stuff of defensible damage awards. In sum, any damage determination produced by the economic methodology proposed by the State will not only not have the force of a rebuttable presumption, but, also, will be struck as unfounded and speculative in violation of common law.

(b) Plan Fails To Develop A Preliminary Estimate Of Damages

Under Section 11.35 of the proposed DOI regulations the State must develop a preliminary estimate of the anticipated costs of restoration, rehabilitation, replacement, and/or acquisition of equivalent resources for the injured natural resources and of compensable value. Proposed 43 C.F.R. § 11.35(a). The proposed regulations set forth detailed guidance

that the State must follow in preparing its preliminary estimate of damages. See Proposed 43 C.F.R. § 11.35(c). The State does not even attempt to develop any sort of preliminary estimate of damages, let alone comply with the specific requirements set forth in the proposed regulations.

Nor could the State prepare such a preliminary estimate. The State has failed to identify or develop the key pieces of information necessary to perform such an evaluation such as identifying the resources and services that have been allegedly injured, an appropriate baseline against which the alleged injury could be measured and the effects or anticipated effects of any response actions.

The proposed regulations permit postponement of this estimate until after completion of the Assessment Plan if there is not sufficient existing data to develop the preliminary estimate of damages. The State, however, acknowledges that "significant amounts of data relevant to the State's assessment have been collected" and that it "intends to review and use . . such existing data." AP, II at 28. Thus, the State has no legitimate excuse for not developing its preliminary estimate of damages as part of the Assessment Plan.

(c) Plan Fails To Develop A Restoration And Compensation Determination Plan.

In preparing its preliminary estimate of costs of restoration, rehabilitation, replacement and/or acquisition of equivalent resources and its preliminary estimate of compensable

value the State must follow the provisions detailed in proposed regulations §§ 11.81-84. These provisions call for "the basis for the development of this estimate." Proposed 43 C.F.R. § 11.35(c)(1)(ii) and (c)(2)(i). Section 11.81 requires the State to:

develop a Restoration and Compensation Determination Plan that will list a reasonable number of possible alternatives for restoration, rehabilitation, replacement and/or acquisition of equivalent resources and the related services lost to the public associated with each; select one of the alternatives and the actions required to implement that alternative; give the rationale for selecting that alternative; and identify the methodologies that will be used to determine the costs of the selected alternative and to determine the compensable value of the services lost to the public associated with the selected alternative.

Proposed 43 C.F.R. § 11.81(a)(1).

The Assessment Plan fails to comply with this requirement. Rather, in the section entitled "Restoration Determination," the State merely provides a general description as to what it intends to do. Subsection 11.81(d)(1), however, provides that the Restoration and Compensation Determination Plan "shall be part of the Assessment Plan." Proposed 43 C.F.R. § 11.81(d)(1) (emphasis added). The State may defer preparation of that plan until after completion of the injury determination or quantification phases only "[i]f existing data are not sufficient to develop" such a plan. Id. Such is not the case here. Although the State represents that "[the restoration determination] will rely on existing data, studies, and modelling efforts, and on the efforts to be undertaken in the injury determination and quantification

work" (AP, II at 31 (emphasis added)), it is clear that the data on which the State plans to rely is currently available. Thus, the State has no excuse for delaying development of its Plan.

The proposed regulations at §§ 11.82 - 11.84 set forth a variety of requirements with which the State must comply in its preparation of the Restoration and Compensation Determination Plan. Given that the State has yet to prepare such a Plan, it necessarily has failed to comply with these requirements. Reviewing these requirements, it is readily apparent why the State has failed to prepare a Restoration and Compensation Determination Plan -- as a result of its failure to comply with the regulations, the State has not developed the information necessary to prepare such a Plan.

For example, proposed section 11.82(b)(2) provides:

- (i) In developing each of the possible alternatives, the authorized official shall list the proposed actions that would restore, rehabilitate, replace, and/or acquire the equivalent of the services provided by the injured natural resources that have been lost, and the period of time over which these services would continue to be lost.
- (ii) The authorized official shall identify services previously provided by the resource in its baseline condition in accordance with § 11.72 of this part and compare those services with services now provided by the injured resource, that is, the with-a-discharge-or-release condition. All estimates of the with-a-discharge-or release condition shall incorporate consideration of the ability of the resource to recover as determined in § 11.73 of this part.

Proposed 43 C.F.R. § 11.82(b)(2). The State has not developed the information necessary to comply with this requirement. The State lacks the most fundamental building blocks necessary to

undertake this task. The State has failed to identify with sufficient detail the resources allegedly injured, where those resources are located and over what period of time those resources have allegedly been injured. More fundamentally, the State has failed to identify in sufficient detail any releases of hazardous substances. Without knowing with specificity the alleged releases and injured resources, the State obviously cannot begin to determine in any meaningful way that any services have been affected by any release of a hazardous substance and, if they have, what services and how they have been affected. Nor can the State determine the baseline services that were allegedly provided by the resource. In order to make a baseline determination the State needs to consider where, when and for how long any alleged releases have occurred. Only then can the State begin to determine an appropriate baseline.

Moreover, the State fails to consider using historical data to assist it in determining baseline conditions or identifying control areas. Given the history of the activity which the State obviously believes has caused releases of hazardous substances which, in turn, have injured natural resources and the historical period for which the State is attempting to assess damages, it is inconceivable that the State does not plan to examine historical data. That is not to say that the State should rely exclusively on that data. The State should, however, use that data to help it identify control areas and to provide a check on and context for the process.

The proposed regulations also require that the Plan incorporate consideration of the ability of the resources to recover. Given the lack of foundation with respect to injury determination it would be meaningless for the State to attempt to develop any credible determination as to recovery periods. Indeed, the State punts this issue with a generic, unsupported assertion that the recovery periods for injured resources "may be on the order of centuries, if not millennia." AP, II at 27. Until the State performs detailed analysis of what, if any, resources have been injured and what services, if any, have been diminished, the State will be unable to estimate natural recovery periods.

Section 4.0 of the Assessment Plan raises issues as to whether restoration is technically feasible and whether its cost would be proportionate or wholly disproportionate to its benefits but does not adequately address either point. If restoration is not technically feasible or if its cost is wholly disproportionate to its benefits, restoration is not appropriate. Subsection 11.82(d) of the proposed DOI regulations requires the State to consider several factors in selecting which damage determination alternative to pursue, including (1) technical feasibility and (2) the relationship of the expected costs of the proposed actions to the expected benefits from the restoration, rehabilitation, replacement, and/or acquisition of equivalent resources. Proposed 43 C.F.R. §§ 11.82(d)(1)-(2). These provisions follow the guidance of the Court of Appeals in State

of Ohio v. Department of Interior, 880 F.2d 432 (D.C. Cir. 1989), that CERCLA does not require recovery of full restoration costs in every case. Id. at 443. In particular, the Court of Appeals stated that "Congress intended recovery not to encompass restoration cost where restoration is infeasible or where its cost is grossly disproportionate to its use value." Id. at 456. This concept should not be new to the State. The current regulations provide that the State must conduct a similar cost-benefit analysis in connection with the Economic Methodology Determination. See 43 C.F.R. § 11.35(c). Nevertheless, the Assessment Plan fails to consider the technical feasibility of restoration or whether the cost of the State's restoration plan will be disproportionate to the incremental benefits provided by its implementation. These are considerations essential to an evaluation of the proposed economic methodology, and their omission is alone fatal to the validity of that methodology.

(d) Proposed Economic Methodology Fails To Consider Offsetting Benefits Provided By ARCO.

In connection with its comparison of services provided by allegedly injured resources before and after a release of hazardous substances, as required by proposed regulation § 11.82(b)(2)(ii), the State must also consider any offsetting benefits provided by ARCO. To the extent that any release for which ARCO may be responsible has caused a reduction in services provided by an injured resource, ARCO should be credited with the

of Ohio v. Department of Interior, 880 F.2d 432 (D.C. Cir. 1989), that CERCLA does not require recovery of full restoration costs in every case. Id. at 443. In particular, the Court of Appeals stated that "Congress intended recovery not to encompass restoration cost where restoration is infeasible or where its cost is grossly disproportionate to its use value." Id. at 456. This concept should not be new to the State. The current regulations provide that the State must conduct a similar cost-benefit analysis in connection with the Economic Methodology Determination. See 43 C.F.R. § 11.35(c). Nevertheless, the Assessment Plan fails to consider the technical feasibility of restoration or whether the cost of the State's restoration plan will be disproportionate to the incremental benefits provided by its implementation. These are considerations essential to an evaluation of the proposed economic methodology, and their omission is alone fatal to the validity of that methodology.

(d) Proposed Economic Methodology Fails To Consider Offsetting Benefits Provided By ARCO.

In connection with its comparison of services provided by allegedly injured resources before and after a release of hazardous substances, as required by proposed regulation § 11.82(b)(2)(ii), the State must also consider any offsetting benefits provided by ARCO. To the extent that any release for which ARCO may be responsible has caused a reduction in services provided by an injured resource, ARCO should be credited with the

benefits that its activities in the area have provided in the form of services that would otherwise not have been available.

Over the years ARCO has provided numerous such services. For example, in 1910, ARCO's predecessor-in-interest, ACMC, acquired property where Georgetown Lake now exists. In the course of its ownership the ACMC raised a dam, which had been built on the acquired land several times increasing the depth of the lake each time. At the time the Lake became navigable, title to the bed and banks of the Lake passed to the State by operation of law. The public has used the Lake from the beginning with the encouragement of ARCO's predecessor through the creation of public access to the Lake. The State began supplementing the natural fish population in the Lake in the early part of the century, and some of the new fish population may have come from a fish hatchery upon land donated to the State by ARCO. Public use of the Lake as one of Montana's major fishing and recreational areas has continued throughout this century. Continuing this tradition of donating benefits to the public, in the early 1980s ARCO paid the State to manage ARCO's lands around the Lake for the benefit of the public.

While the primary donation to the public was that of the Lake itself, there have been numerous other related donations of easements connecting the Lake and associated recreational areas surrounding the Lake together with use of mining company lands for access to the Lake itself. Permanent easements have been given to the county, State and federal Governments together with

others so that all of the amenities, not only of the Lake, but of the areas surrounding the Lake have been available to the public.

The stream of benefits the public has received and will receive from these donations is substantial. Georgetown Lake and the surrounding area have been and will continue to be one of Montana's leading public recreational areas. Georgetown is probably the most heavily fished lake in the State and supports many other recreational activities.

In 1937 the ACMC deeded/donated to Montana State University (now University of Montana) approximately 19,700 acres of forest land in the Blackfoot River drainage for use by the Montana Forest and Conservation Experiment Station. The University used this land for commercial logging, scientific experimental work and educational purposes since 1937. The economic value of the services provided by this resource must be assessed and accounted for in the State's Assessment Plan.

Over the last 100 years ARCO's predecessor in interest made other donations of resources to the State which provided to the State additional economic benefits.

The value of these benefits bestowed by ARCO and its predecessor upon the public must also be assessed and that assessment deducted from any amount of natural resource damages that the State alleges are the result of activities attributable to ARCO. The Assessment Plan's failure to consider and account for these benefits is a fatal deficiency.

(e) Plan's Discussion Of Compensable Values Is Flawed.

Unable to develop a preliminary estimate of damages and to prepare a Restoration and Compensation Determination Plan, the State attempts to gloss over these deficiencies by falling back on a discussion of compensable values. Compensable value is defined as "the amount of money required to compensate the public for the loss in services provided by the injured resources between the time of discharge or release and the time the resources and the services those resources provided are fully restored to their baseline condition." Proposed Regulation 11.83(c)(1). From this definition, however, it is apparent that the determination of compensable value is also dependent on the same information which is required to prepare the Restoration and Compensation Determination Plan and which is entirely missing in the Assessment Plan.

The State's discussion of compensable values and the valuation methodologies it plans to use is thus without foundation or substance and is meaningless. The result is a "plan" that shares the same flaws as all of the State's previous assessment plan efforts -- a hopelessly general, necessarily vague discussion as to the steps the State plans to take at some point in the future. The Assessment Plan, including the determination of compensable values must provide more. The Plan must be in sufficient detail to "ensure that the assessment is performed in a planned and systematic manner and that methodologies selected . . . can be conducted at a reasonable cost" 43 C.F.R. § 11.30(b). General descriptions as to

what the State plans to or may do are inadequate to accomplish this objective. The Assessment Plan provides little, if any, additional information as to the nature of the State's assessment contrary to regulation requirements. For example, with respect to non-fishing recreational use, the State describes its objective as "to relate changes in natural resource injuries to changes in river corridor recreation levels and use values, and to wildlife use levels and use values." AP, II at 40.

b. Division of Assessment Plan Into Two Parts Has Resulted In A Confused And Disjointed Plan.

The State has divided the Assessment Plan into two parts. This piecemeal approach to preparation of the Plan is hardly conducive to assuring that the assessment is performed in a planned and systematic manner. Rather, the result is a disjointed product which provides no assurances that duplicative efforts will be avoided either in the preparation of the Assessment Plan or during the assessment itself or that all the necessary steps have been taken.

It will be difficult, if not impossible, to work with this confused, fragmented product. The State's approach to the Assessment Plan reaffirms that the State is preparing the Plan to create the appearance that it has met regulatory requirements, not to assure that the assessment is carried out in an organized and cost-effective manner as required by the regulations or in compliance with the substantive requirements of the regulations.

- c. Plan Fails To Permit A Determination Whether The State Has Chosen A Method For Assessing Damage That Is Likely To Be Cost-Effective And Meets The Definition Of Reasonable Costs.

Not only does the Assessment Plan fail to provide a planned and systematic approach for the assessment, it fails to discuss whether the approach used for assessing the damage is "likely to be cost-effective and meets the definition of reasonable costs." 43 C.F.R. § 11.31. In fact, the Assessment Plan does not even acknowledge this requirement. Moreover, the Assessment Plan fails to provide information sufficient to determine whether the State has chosen a method for assessing damage that is likely to be cost-effective and meets the definition of reasonable costs.

The regulations describe the type of information necessary to evaluate cost-effectiveness or reasonableness. Section 11.31(a)(2) provides that the Assessment Plan "shall be of sufficient detail to serve as a means of evaluating whether the approach used for assessing the damage is likely to be cost-effective and meets the definition of reasonable costs" 43 C.F.R. § 11.31(a)(2). The regulations elaborate further as to the level of detail that is required to make this determination:

The Assessment Plan shall include descriptions of the natural resources and the geographical areas involved. In addition, for Type B assessments, the Assessment Plan shall include the sampling locations within those geographical areas, sample and survey design, numbers and types of samples to be collected, analyses to be performed, preliminary determination of the recovery period, and other such information required to perform the selected methodologies.

Id. None of this information is contained in the State's Assessment Plan. Instead, as has been discussed, the Assessment Plan merely contains general, almost generic, descriptions of the steps it plans to perform.

With rare exception, the "Research Plans" do not provide information with respect to: (1) specific assessment or "control" sampling locations identified on maps or in the text provided, (2) specific listings of the numbers and types of samples to be collected, or (3) analyses of the resultant data. The requirements of 43 C.F.R. § 11.71(c)(1)(6) cannot be met without such fundamental information. This information is also prerequisite to meeting the Quality Assurance requirements set forth in 43 C.F.R. § 11.63(f)(5) and (6). The Assessment Plan must be revised to include this significant specific information.

- d. Plan Fails To Demonstrate That The Damage Assessment Has Been Coordinated With Any Remedial Investigation, Feasibility Study Or Other Investigation Performed Pursuant To The NCP.

The regulations also require that the Assessment Plan "contain information sufficient to demonstrate that the damage assessment has been coordinated to the extent possible with any remedial investigation feasibility study or other investigation performed pursuant to the NCP." 43 C.F.R. § 11.31(a)(3). Coordination helps avoid duplicative efforts and promotes cost-effectiveness. The Assessment Plan fails to demonstrate that the damage assessment has been coordinated in any way with the remedial investigation feasibility study. The Assessment Plan,

Part I merely states that "data, information and reports prepared as part of the Superfund process have been provided to the Natural Resource Damage Program." (AP, I at 7). This statement does not demonstrate coordination. It merely indicates that the State has received certain information. The Assessment Plan is completely devoid of any discussion as to how, if at all, this information was used. There is no assurance that efforts are not being duplicated, that remedial investigations and actions have been considered, or that these reports have even been read. Part II of the Plan does not provide any additional information regarding any coordination efforts and, thus, compounds this deficiency. (Perhaps this is not surprising as RI/FS activities and remedy selection will not be concluded for at least 10 years. See AP, II at 27.)

D. Assessment Plan, Part II Reflects The Deficiencies In The Preassessment Screen Which Have Become Systemic.

1. Plan's Failure To Make Required Determinations In The Preassessment Screen Renders Confirmation Of Exposure Meaningless.

The DOI regulations require that "the authorized official shall confirm that at least one of the natural resources identified as potentially injured in the preassessment screen has in fact been exposed to the . . . hazardous substance." 43 C.F.R. § 11.34(a)(1). This determination is dependent on whether the State, in the first instance, properly identified those natural resources as being potentially injured by a hazardous substance in the Preassessment Screen. The State's failure in the Preassessment Screen adequately to make preliminary

determinations regarding identification of natural resources, the release of hazardous substances, injury or potential injury, and the ability of response actions to remedy the claimed injury has created a systemic problem which is now a fatal defect in the assessment process. Without these determinations, any attempt to confirm exposure is meaningless. The State, in the Assessment Plan Part II, makes no attempt to correct these deficiencies. Instead, the State merely reiterates that it will identify "sources of hazardous substances and the nature and extent of releases and re-releases." This confirms that the information presented in Sections 5.0 and 6.0 of Part I of the Assessment Plan is inadequate for that purpose.

- a. Failure Of Preassessment Screen To Make The Required Preliminary Determination As To Injury Or Potential Injury To Natural Resources Renders Confirmation Of Exposure Meaningless.

The State failed to make the required preliminary determination in the Preassessment Screen as to injury or potential injury to natural resources. Before proceeding with an assessment, the trustee must demonstrate that "[t]he quantity and concentration of the discharged oil or released hazardous substance is sufficient to potentially cause injury . . . to those natural resources." 43 C.F.R. § 11.23(e)(3). The trustee's failure to demonstrate injury is fatal. The Department of the Interior's comments on this subject are unequivocal:

To assert a natural resource damage claim, the authorized official must establish that an injury occurred and must link that injury to the discharge or release. Otherwise, no further

assessment actions are to be taken and no assessment costs will be recovered.

51 Fed. Reg. 27679.

As directed by the regulation, in making its injury determination, the trustee must look to the definition of injury as that term is used in the regulations. The regulations require the trustee "to determine that an injury has occurred to natural resources based on the definitions provided in this section . . ." 43 C.F.R. § 11.62. The regulations enumerate the conditions that the trustee must show with respect to specific resources in order to determine that those resources have been injured. The regulations provide definitions for surface water, ground water, air, biological and geological resources. As has been discussed in detail, the State has failed to demonstrate adequately that any of those resources have been injured.

The State's discussion in both parts of the Assessment Plan of alleged exposures of various resources does not cure this deficiency. The Assessment Plan, for the most part, merely regurgitates the information contained in the Preassessment Screen; it does not demonstrate that any resource has been injured.

The State must determine that a natural resource has been injured before it can proceed to the confirmation of exposure step. The State's assertion in the Assessment Plan that certain resources have been exposed to hazardous substances is meaningless given that the State has failed to demonstrate that those resources were injured. The State has created a systemic

problem which can only be remedied by withdrawing both the Preassessment Screen and Assessment Plan and beginning again in substantive compliance with the regulations. By failing to do so, the State is building on a defective foundation, and the assessment this process results in will not stand.

- b. Failure Of Preassessment Screen To Make Required Preliminary Determinations As To Current Response Actions Or The Inability Of Those Response Actions To Remedy The Claimed Injury Renders Confirmation Of Exposure Meaningless.

The State has also failed to make the required preliminary determination in the Preassessment Screen that "[r]esponse actions, if any, carried out or planned do not or will not sufficiently remedy the injury to natural resources without further action." 43 C.F.R. § 11.23(e)(5). The Preassessment Screen failed to identify even a single response action carried out or planned, let alone determine that response actions will not sufficiently remedy the claimed (but unidentified) injury.

The Assessment Plan does not provide any further clarification. The Assessment Plan, Part I, merely states that the Natural Resource Damage Program has "communicat[ed] with federal and state project managers for the various operable units" and that "[d]ata, information and reports prepared as part of the Superfund process have been provided to the Natural Resource Damage Program." AP, I at 5. The Assessment Plan, Part II is completely devoid of any further discussion with respect to response actions. Without this information, it is impossible to determine whether any injury that may have occurred remains.

This threshold determination must be made before exposure can be confirmed.

c. Failure Of Preassessment Screen To Make The Required Preliminary Determinations Regarding Release Of Hazardous Substances Renders Confirmation Of Exposure Meaningless.

Confirmation of exposure is also dependent on preliminary determinations being made in the preassessment screen regarding the release of hazardous substances. The State's Preassessment Screen, however, does not make the preliminary determinations regarding the occurrence of a release of a hazardous substance (43 C.F.R. § 11.23(e)(1)), time, quantity, duration, and frequency of the discharge or release (43 C.F.R. § 11.24(a)(1)), or the hazardous nature of the described releases (43 C.F.R. § 11.25(a)(2)). The Preassessment Screen simply lists 13 hazardous substances which it says have been ". . . identified thus far as having been released . . ." from locations within the Clark Fork River Basin area but fails to state from what, if any, facility any of the substances was released.

The regulations also require that the trustee determine the time, quantity, duration and frequency of the release or releases in question. 43 C.F.R. § 11.24(a)(1). Nowhere in the Preassessment Screen does the State even make a pass at attempting to satisfy this requirement.

The State makes the general and unsupported assumption that mine waste substances are "hazardous substances" and that the State may recover for damage to natural resources allegedly caused by release of such substances. The State has failed to

examine this issue in light of the applicable law, therefore it has failed to make the required preliminary determination under 43 C.F.R. § 11.23(e)(1) that a "release of a hazardous substance has occurred." (emphasis added)

Mine waste "from the extraction, beneficiation and processing of ores and minerals" are not hazardous substances under CERCLA. CERCLA § 101(14), 42 U.S.C. § 9601(14), which defines hazardous substances, specifically exempts "any waste, the regulation of which under the Solid Waste Disposal Act has been suspended by Act of Congress." Regulation of "[s]olid waste from the extraction, beneficiation and processing of ores and minerals, . . ." had been suspended by Act of Congress in § 3001(b)(3)(A)(ii), 42 U.S.C. § 6921(b)(3)(A)(ii), of the Solid Waste Disposal Act, prior to the enactment of CERCLA. Therefore, the State cannot recover for the damages it claims as a result of the release of mine waste substances which are not "hazardous" under the statutory definition. Confirmation of exposure to substances that the State has failed to demonstrate are hazardous is meaningless.

The Assessment Plan does not correct these deficiencies. Part I again merely lists several hazardous substances which the State claims have been released. In an apparent attempt to identify the locations of these releases, the State lists several areas that are alleged to contain various amounts of "waste material." This description is not sufficient to overcome the deficiencies of the Preassessment Screen. The State's

description does not identify which substances are allegedly contained in these "wastes", let alone whether there has been a release. Moreover, the State has failed to provide information regarding time, quantity, duration and frequency of the discharge or release as required by the regulations.

- d. Failure Of Preassessment Screen To Make The Required Preliminary Determination And Identification Of The Natural Resources Which Have Been Or Are Likely To Have Been Adversely Affected By Releases Renders Confirmation Of Exposure Meaningless.

The State must also confirm in the Assessment Plan that natural resources identified as potentially injured have been exposed. 43 C.F.R. § 11.34(a)(1). The State, however, has failed to make the required preliminary determination and identification of the natural resources which have been or are likely to have been adversely affected by releases. The State's attempt to confirm exposure to natural resources that have not been properly identified provides yet another example of the systemic problems caused by the State's failure to perform an adequate Preassessment Screen.

The State's Preassessment Screen does not make the required determination that any natural resource for which the State may assert trusteeship under CERCLA has been or is likely to have been adversely affected by release of a hazardous substance, nor does the Preassessment Screen identify, as is also required, any natural resource for which the State is trustee which is potentially affected by the alleged release of a hazardous substance. See 43 C.F.R. §§ 11.23(e)(2) and 11.25(e)(1) and (2).

The State, in the Preassessment Screen, purports to address pathways by which natural resources might be affected, describes only very generally and completely inadequately surface waters, ground waters, sediments, riparian vegetation, certain biological samples and then simply lists ten categories of natural resources with no effort at specific identification except as to only three. As to the three, the State has under "surface water" included the Clark Fork River, Silver Bow Creek, Warm Springs Creek, Willow Creek, and Warm Springs Ponds; under "groundwater," the State has included ". . . aquifers underlying Butte, Anaconda and Milltown;" under "Riparian Wetlands," the State has included Warm Springs Ponds. The State has only generically described services of those resources affected or potentially affected. For example, the State lists water for "drinking and other domestic uses," and ". . . for irrigation of crops and livestock," ". . . contact recreation, including swimming, boating and other activities," and ". . . air for breathing, visibility and aesthetics."

These completely general, if not generic, descriptions of resources and related services simply do not satisfy the requirements of 43 C.F.R. §§ 11.23(e) and 11.25(e)(1) and (2). As has been noted, the point of the preassessment screen review is to determine whether there is a sufficient basis to proceed to assessment of injury and quantification of damages process. Thus, in order to meet the requirements of the regulations as they fulfill the purpose of the preassessment screen, the State

must specifically determine and identify the natural resources and related services which have been or might have been injured by the release of a hazardous substance and the resources and services must be tied to or identified with a particular release which itself must be sufficiently identified in terms of time, duration, cessation and other circumstances so that it may be determined whether the release or releases in question occurred prior to the enactment date of CERCLA (December 11, 1980), occurred as part of an irreversible and irretrievable commitment of resources and/or constitute a permitted release, so as to be exempt from liability under CERCLA and the regulations. No such link is even attempted in the Preassessment Screen.

Moreover, under the regulations, in its Preassessment Screen, the State must make a preliminary determination that:

[n]atural resources for which the federal or state agency may assert trusteeship under CERCLA have been or are likely to have been adversely affected by the discharge or release.

43 C.F.R. § 11.23(e)(2). The State has not complied with this regulation. The State has ignored this key element in its assessment in failing to identify the natural resources and their geographical locations for which the State claims a trustee relationship. Without such identification, the State cannot assess alleged damages to those natural resources, and therefore it cannot justify proceeding with an assessment.

By failing to identify the natural resources that have been potentially injured, the State cannot confirm whether those

natural resources have in fact been exposed to a hazardous substance.

The Assessment Plan makes no attempt to correct these deficiencies. Although the Assessment Plan purports to address activities associated with injury determination and quantification of resources, the Plan does not provide any additional detail sufficient to enable the State to conclude that the State may assert trusteeship over those resources or that those resources have been adversely affected by a release of a hazardous substance.

E. Assessment Plan Does Not Comply With The Requirements Of The Regulations Concerning Identifying And Involving All Potentially Responsible Parties.

In flagrant violation of the DOI regulations, 43 C.F.R. § 11.32(a)(2), the State has failed to make any effort to identify and involve in the assessment process a number of parties, other than ARCO, whose activities in the Clark Fork River Basin NPL Sites area are well known to the State. Rather, the State, impermissibly and unfairly, has identified and involved only ARCO in the natural resource injury and damages assessment process. This deficiency alone materially compromises the State's assessment process and the Plan even if the process and Plan were otherwise sufficient. In addition, this deficiency constitutes just another reason why the State is absolutely not entitled to a rebuttable presumption with respect to the adequacy of the Plan. ——————Section 11.32(a) addresses "[p]re-development requirementsshall fulfill the

following requirements before developing an Assessment Plan."

(Emphasis added.) The second of those requirements is set forth in 43 C.F.R. § 11.32(a)(2) entitled "identification and involvement of the potentially responsible party" and provides as follows:

(2) Identification and involvement of the potentially responsible party: (i) If the lead agency under the NCP for response actions at the site has not identified potentially responsible parties, the authorized officer shall make reasonable efforts to identify any potentially responsible parties. (ii) In the event the number of potentially responsible parties is large or if some of the potentially responsible parties cannot be located, the authorized official may proceed against any one or more of the parties identified. The authorized official should use reasonable efforts to proceed against most known potentially responsible parties or at least against all those potentially responsible parties responsible for significant portions of the potential injury.

Nowhere in the Assessment Plan does the State address this requirement, its obligation to ". . . use reasonable efforts to proceed against most known potentially responsible parties . . ." (43 C.F.R. § 11.32(a)(2)(ii)), nor does the State anywhere in the Plan mention a potentially responsible party other than ARCO. Moreover, the State's default on this requirement is not just that it failed to identify potentially responsible parties other than ARCO in the Plan; the requirement is to fulfill the obligation of identifying and involving potentially responsible parties ". . . before developing an Assessment Plan." 43 C.F.R. § 11.32(a)...(emphasis added) Indeed, the whole scheme for assessment of natural resource injury and damages as reflected in

the Department of Interior regulations is to identify all potentially responsible parties as early as possible in the process, and explicitly before an assessment plan is developed, and involve them in the assessment process in order to put all potentially liable parties on notice of the process as well as to insure that the requirements of the regulations are substantially and meaningfully fulfilled and the most reasonable, appropriate and cost effective assessment is achieved. As with its Preassessment Screen and other aspects of the Assessment Plan, the State has not even made the slightest effort to identify and involve potentially responsible parties other than ARCO although such other PRPs are well known to the State.

Such other PRPs would include, for example, five persons who have been involved with the operations and activities of Montana Resources in the area of the Berkeley Pit (part of the Silver Bow Creek/Butte Area NPL Site) and whose identities are known to the State of Montana, the United States of America which has owner liability with respect to much of the area of the Clark Fork River Basin NPL Sites, and, indeed, the State itself which has owner, operator, arranger and transporter liability arising out of its ownership of lands and waters as well as its acts and omissions within the Clark Fork River Basin NPL Sites.

The Montana Resources group includes Dennis R. Washington, Montana Resources, Inc., Asarco, Inc., AR Montana Corporation and Montana Resources, a partnership. Since 1986, these persons have been engaged in and responsible for mining and related operations

for which Montana Resources has been importing several millions of gallons of water a day into the drainage without treatment, much of which is making its way into the Berkeley Pit as the lowest point in the hydraulic system. Moreover, this importation of water by Montana Resources is stimulating the flow of additional millions of gallons of water a day to the Berkeley Pit from groundwater sources. About 1.5 millions of gallons of water a day flow to the Berkeley Pit from completely controllable sources originating on Montana Resources property. These activities are causing a daily average of over one million gallons of untreated, contaminated water, containing substantial quantities of heavy metals, to be discharged into the Berkeley Pit with the result that the level of water in the Berkeley Pit is rising due to MR's activities which are also contributing to potential groundwater quality concerns relating to water contained within the Berkeley Pit. Indeed, the Assessment Plan, Part I identifies this impact on groundwater resources --

Water samples taken in the Berkeley Pit -- which is filling with groundwater from the Butte aquifer -- have shown extremely elevated concentrations of arsenic (1,380 ppb), cadmium (1,860 ppb), copper (213,000 ppb), lead (576 ppb), and zinc (505,000 ppb) (Camp Dresser & McKee 1988, in Johnson and Schmidt 1988). Further evidence of widespread contamination in the Butte Hill area is illustrated by groundwater obtained from the Travona Mine in January and February 1989: groundwater had mean concentrations of 177 ppb arsenic (Duaime et al. 1989). CH₂M Hill and Chen-Northern (1990) documented dissolved concentrations of copper in excess of 490,000 ppb, zinc in excess of 300,000 ppb, lead in excess of 3,500 ppb, arsenic in excess of 800 ppb, and cadmium in excess of 1,770 ppb in the upper alluvial aquifer near Silver Bow Creek in Butte.

-- but has not identified any of the Montana Resources group as a PRP despite being on notice of their operations and the impact of those operations.

The State's knowledge of the Montana Resources group's operations and their environmental effects is reflected in the fact that Montana Resources has been named as a PRP for the evaluation and remediation of the Butte Site under CERCLA by the U.S. Environmental Protection Agency. It is also reflected in a letter of September 26, 1991 from Sandra J. Olsen, Chief, Hard Rock Bureau, Reclamation Division, Department of State Lands, State of Montana to John F. Gardner, President, Montana Resources, Inc., Butte Montana. Moreover, by letter dated October 7, 1991, ARCO advised the Department of State Lands of the nature of the Montana Resources group's operations and their impact on the Berkeley Pit and surrounding Butte area (and, also on October 7, 1991, sued the Montana Resources group under CERCLA and other theories for the clean-up costs and possible natural resources damages attributable to Montana Resources' activities).

Despite the State's knowledge of Montana Resources' operations and their impact on Berkeley Pit and surface and groundwater resources in and around the Silver Bow Creek/Butte Area NPL Site, none of the Montana Resources group is identified as a PRP in the Assessment Plan. This flagrant and, it would appear, gratuitous violation of the 43 C.F.R. § 11.32(a)(2) requirement indicts the entire Plan.

The United States of America is also a PRP for purposes of any natural resource injury and damages claim involving the Clark Fork River Basin NPL Sites area. The land in and around Butte was originally federal land, and mining claims were staked on virtually all of it. Records at the Billings, Montana Bureau of Land Management office show that almost the entire city of Butte and its surrounding area were located on lands that were originally mining claims. For the period of the greatest mining activity, less than one-half of these mining claims had been patented leaving the federal government as owner of the land on which these operations were conducted. In addition, BLM records also reflect that many of the early milling and smelting operations in and around Butte was conducted on federally-owned lands subject to unpatented mining claims. Moreover, BLM records also show that the federal government owned much of the stream bed, banks and flood plain of Silver Bow Creek and Missoula Gulch for the period prior to 1885 and during the time that extensive mining, milling, smelting and concentrating activities along Silver Bow Creek had commenced and mining and mining operations residues and wastes were being disposed of into SBC. Again, this history is well known to the State, and yet the State has not, in the Assessment Plan, even so much as mentioned the United States, much less identified the federal government as a PRP.

The State of Montana is a PRP for purposes of the State's natural resource damages assessment for the Clark Fork River Basin NPL Sites area. The State has expressly determined that it

is, and throughout its history has been, the owner of portions of Silver Bow Creek and the Clark Fork River as well as the waters therein. Irrespective of ownership, both the Territory and State also had the right to and did exercise control over the waters and water courses within the Clark Fork River Basin. It has been extensively documented that the Territory and State, for their own development and economic advancement, utilized their ownership interest in and control over the waters and water courses within the Clark Fork River Basin to create and facilitate the very conditions with respect to which the State now contends in its assessment caused injuries to natural resources. For instance, the Territory and State acted early on to protect the waters and water courses from the timber and coal mining industries. Neither the Territory nor the State, however, took any such action with respect to the mineral processing or waste disposal practices of the metals mining industry. In fact, the State refused to exercise its right to control these historic practices and, thereby, under Montana law, authorized them.

The Territory and State's involvement, however, did not stop with mere inaction. Affirmative steps were taken to support and facilitate the mineral processing and waste disposal practices. The Territory and State delegated their sovereign power of eminent domain to the mining industry to:

- (1) Secure rights-of-way to carry water to mines, mills and smelters;

- (2) Secure rights-of-way for flumes to carry water and tailings away from working mines;
- (3) Obtain roads, tunnels, ditches, flumes, pipes and dumping places;
- (4) Obtain outlets, natural or otherwise, for the flow, deposit or conduct of tailings or refuse matter; and
- (5) Obtain an occupancy in common any place for the flow, deposit or conduct of tailings or refuse matter.

The use of these state powers was in fact instrumental in the development and continuation of the historic waste disposal practices in the waters and water courses of the Clark Fork River Basin NPL Sites.

The State also decreed water rights for the express purpose of transporting tailings to the Clark Fork River for disposal. In the 1950s, in order to continue the prevailing disposal practices, the State also went so far as to designate Silver Bow Creek as an open sewer or disposal unit for waste transport, rather than a stream. Moreover, the State used its ownership interest in and control over Silver Bow Creek to resist all efforts to alter this designation until the early 1970s.

The Territory and State, through their statutes, regulations, delegations of eminent domain and affirmative omissions, set out to and did arrange for the removal of all barriers to the mining industry's disposal of tailings and other refuse matter directly into the waters and water courses in the Clark Fork River Basin NPL Sites. The State had the power and

authority to abate these disposal practices at any time, but instead promoted, facilitated and arranged them. These State activities and control over disposal practices facilitated, authorized and encouraged the alleged impacts to the Clark Fork River Basin NPL Sites identified in the State's Assessment Plan.

It has also been well documented that the State accepted for transport and did in fact transport tailings and other refuse matter in its waters and water courses within the Clark Fork River Basin Sites. In this case, the disposal facility consisted of the beds and banks of the water courses. The State and Territory, through their statutes, regulations, delegations of eminent domain and affirmative omissions, effectively selected this disposal facility. Again, this history has been documented in detail and is well known to the State, and yet the State has not, in the Assessment Plan, even so much as mentioned itself as a PRP.

Simply stated, the State of Montana's failure to name the Montana Resources group, the United States or itself as a PRP in the Assessment Plan is such a significant flaunting of the letter and substance of the regulations that it alone is grounds for withdrawing the entire Plan.

II. TECHNICAL COMMENTS.

A. General Comments.

Part II of the natural resource damage Assessment Plan (Part II) prepared by the State of Montana, like Part I, provides a very superficial description of the scientific and economic methodology expected to be performed during the injury determination, quantification, and damage determination phases of the Type B assessment. Part II cites heavily from, but fails to comply with 43 C.F.R. Part 11, in some cases not addressing at all and in other cases not addressing sufficiently how the State will by the research plans or otherwise establish and quantify injury and presenting very little existing data interpretation or synthesis.

ARCO's general comments on Part I of the Assessment Plan also apply to Part II. The State's overall strategy for assessing natural resource injuries is superficial and poorly developed. The impacts of industries and human activities other than the mining industries and related activities (*e.g.*, agriculture, forestry, and transportation) on natural resources and the services or uses of natural resources have been neglected entirely. Specific control locations are identified for few of

the studies; no rigorous or consistent criteria for choosing control sites are provided; and no statistical or other justification is given to measure either 1) the similarity of ancillary conditions between the "control" and "impacted" sites, or 2) how large the differences in concentrations of hazardous substances must be between these sites to be considered significantly different. Methods for performing major elements of the sampling and analysis of injuries, including any transport and fate modeling, are not described in any detail (as required by 43 C.F.R. § 11.63). These issues must be resolved if baseline conditions of the resources and deviations from baseline are to be adequately defined from the 1880s to the time of recovery of natural resource services.

The time period for which the State is assessing such injuries is not clearly defined nor is any method for tracking baseline services through time, either historically or in the future, provided. This is critical to any damage assessment, and without any further explanation, neither the public nor ARCO can evaluate the proposed assessment plan or provide any constructive comments.

The Plan focuses exclusively on natural resources themselves, failing to provide methodologies for either injury determination or quantification in terms-of-services-or-uses of natural resources.

The research plans set forth in Part II of the Plan contemplate much additional sampling and field work that is not necessary or appropriate and, thus, will not meet the "reasonable and necessary" cost requirement of 43 C.F.R. § 11.30(c)(2). For example, none of the wildlife studies described are justified as there is no demonstrated injury or impact on wildlife populations or services.

The information provided in the section on preliminary determination of recovery periods is biased and inadequate. The discussion contradicts itself (e.g., the stated objective to assess recovery of services is set forth exclusively in terms of chemical persistence in resources), and information used to support major conclusions is cited out of context.

These flaws in evaluating natural resource injuries will ultimately result in inaccurate and inappropriate calculations of damages.

B. Specific Comments.

1.1, page 1, para. 3²

² Reference numbers are to the sections of the Assessment Plan, Part II, page number in Part II and paragraphs in Part II counted from the beginning of the section referred to or from the top of the identified page if the section runs for more than one page. Upon occasion, section and subsection titles and bullet references are used for clarity.

The State asserts that it reviewed comments from ARCO and other interested parties on the Assessment Plan, Part I. However, other than that statement, there is no indication that those comments were considered or have been addressed in Part II of the Plan, except for the description of proposed field sampling of surface water omitted in Part I (provided in section 2.5 of Part II), and the revision of the control site to be used for groundwater injury assessment in Butte.

1.1, page 2, para. 2

The State says that its responses to the comments received on Parts I and II of the Assessment Plan will not be provided until the Report of the Assessment is released. Given the broad scope of the proposed assessment effort, the superficial approach reflected in Parts I and II of the Plan and the comprehensive, fundamental, and substantive nature of the comments submitted, a more timely response is not only appropriate but, more important, essential to a reliable assessment. Indeed, the State should suspend its current assessment activities until it cures the basic deficiencies described in the comments. Certainly, the State should not implement this flawed Assessment Plan and produce an invalid and unreliable Report of Assessment which, also, will constitute a complete waste of public funds.

2.0, page 3

Section 2.0 is virtually identical to Section 7.0 of Part I of the Plan; only minor modifications address the different resources addressed in Part II. ARCO's comments on Section 7.0 of Part I apply here as well.

2.2, page 4

Section 2.2 is virtually identical to Section 7.2 of Part I of the Plan. This section relies entirely on the language of 43 C.F.R. § 11.63. The absence of any detail and of any discussion of the effectiveness versus cost of the various methodologies preclude an evaluation of whether any pathway determination methodology is likely to be cost effective. Thus, this discussion fails to meet the requirements of 43 C.F.R. §§ 11.31 and 11.63.

2.2, page 4, para. 1

Models cannot determine pathways; at best they can only predict potential for exposure.

2.3.4

Here and throughout the Assessment Plan, reference is made to the use of control sites, and some selection factors and physical characteristics of proposed control sites are mentioned. For these areas to be useful control sites, anthropogenic factors must also be included. If the State's injury assessment research design is based on comparing

impacted sites and these yet to be defined control sites, the control sites must have the same physical attributes as the affected areas and the same human use activities as the affected area study sites except for the alleged release of hazardous substances. If this is not the case, then any observed differences may be related to causes other than the alleged release of hazardous substances. The selection of the control sites is a critically important part of the Assessment Plan, since the degree of injury will be based on data from those sites. The State's approach to the use of control sites fails utterly to address the issue of anthropogenic factors and comparability of those factors between control sites and affected areas.

2.3.4, page 6, para. 1

If, as the State suggests, existing data are sufficient to document air quality, then the State must identify those studies it will rely on and the manner in which those studies are going to be utilized in injury determination and quantification.

2.3.4, page 6, Injury Quantification

The Plan's (Part II) one sentence on the approach of the research plan to injury quantification for air resources is totally inadequate and fails to comply with 43 C.F.R. § 11.63(d)(3)(i). The Plan must include and fails to include

the methods and analyses to be used to determine the duration and frequency of any alleged injury to air resources.

2.4 (Introductory paragraph.)

The basic approach to the so-called terrestrial resources study seems to be focused on proving or substantiating previously established conclusions regarding the status of contamination within the study area. There is no attempt to define and test hypotheses about the status of contaminants. An objective research design would focus on defining hypotheses and then designing experiments to test these hypotheses. The Assessment Plan is designed to demonstrate contamination, and, to this end, any scientific objectivity is lost.

In the first paragraph (line 6), reference is made to phytotoxicology protocols. There is no definition or description of what these protocols are.

In the last line of the first paragraph reference is made to quantifying reductions in wildlife habitat. But, importantly, there may not actually be any reductions in wildlife habitat. Habitats are still present on all sites, although they may be different from what was present prior to any industrial activities in the region. Changes in habitat that have occurred over the past 100-120 years may not all be

detrimental to wildlife populations, and changes in wildlife populations, if any, may not be related to alleged releases of hazardous substances.

2.4.1.1, page 8, 3rd bullet

The State's plan for assessment of terrestrial and surface water resources as described in Parts I and II of the Plan does not make clear where soils begin and sediments end. If sediment quality criteria are implemented, this will become important, especially as water levels drop during the summer. Certainly the difference in oxidation states between these two sources will assure very different leachate toxicities, if the sediments are handled properly.

Without knowing more than metals concentrations in the soils (e.g., carbonate and organic carbon), the State will not have sufficient information to determine if the soils contain concentrations sufficient to cause injury to surface waters.

2.4.1.2, page 8, 3rd bullet

Riparian vegetation invades the emerging stream bed as water levels drop. If phytotoxic conditions are found, this is as likely due to water withdrawal, and sediment oxidation, as to mine tailings.

2.4.1.3

This section refers to the use of control areas for evaluating natural resource injury on the basis of a comparison of impacted sites with control areas. The selection of control areas is a critically important element of the assessment but no control areas are identified nor are specific criteria for selecting them discussed. The section also refers to indicator species but no indicator species are identified nor are the regulatory criteria for selecting them tied to the ecological systems at issue here. Moreover, comparisons are to be based on wildlife population densities; it is highly questionable that, even if adequate control areas (yet to be defined) are found, it will be possible to obtain statistically accurate estimates of population densities.

2.4.1.3, page 8, 1st bullet

Concentrations of hazardous substances in prey organisms alone will not provide a meaningful analysis of injury, since it neglects bioavailability and assimilation efficiency.

2.4.1.3, page 9, 2nd bullet

Especially sensitive species are useful only if they are a natural component of the ecosystem in question. For example, Daphnia are especially sensitive to metals, but they are not found in rivers.

2.4.2.2, page 9, para. 1

To the extent the vegetation sampling contemplated by the State duplicates existing remedial investigation and feasibility study data, additional data collection is not necessary and would not be cost efficient.

2.4.2.3, page 10, para. 2

There is only one exposure route here, and it is indirectly acquired as a result of feeding. Reduction of habitat is not an exposure to wildlife. Furthermore, this is double counting, since vegetation and soil analyses will be performed and tallied separately.

2.4.2.3, page 10, para. 2

The tissue analysis of wildlife is neither necessary nor justified because existing data demonstrate that wildlife populations have been affected by poor wildlife management and that recovery of wildlife populations has been steady to the point that most areas have as many species and numbers of wildlife as baseline conditions and habitat will support. Moreover, no data support the inference that the overall condition of wildlife population in the State's allegedly "impacted sites" is different or worse than that of unaffected areas.

2.4.3.1, page 11, 3rd bullet

The Assessment Plan does not adequately define injury to soils. Thus, the research plan cannot lead to any valid or meaningful quantification, and, thus, its stated objective cannot be achieved.

2.4.3.1, page 11, 4th bullet

Nowhere else in the Plan does the State discuss methods by which to map the historical areal extent of allegedly injured soils. While the State may decide to use archival aerial photographs to map the extent of bare soils, this methodology does not support an a priori determination of the extent of injury.

2.4.3.2

The objectives of the research plan are not based on objective hypotheses but rather they have been defined on the basis of proving previously established assumptions. (K) For example, the wording at section 2.4.3.2, page 12, 1st bullet indicates that the State has reached an a priori conclusion from experiments that have not yet been conducted, violating the integrity of the scientific method. Results obtained from a design with this point of view will be skewed in the direction of proving the established assumptions rather than simply objectively evaluating stated hypotheses. This comment applies to much of the research design. Hypotheses are not clearly stated. The research plans are designed to

obtain data specifically to support already established points of view.

2.4.3.2, Injury Determination, 1st bullet

Part of this program is based on laboratory (greenhouse) studies. These are not applicable to actual field conditions. Toxic reactions shown in the greenhouse with crop species may not have any real bearing on what is actually occurring in the field with native and introduced perennial grasses.

Injury determinations for vegetation are designed to be made using control areas. ARCO's general comments regarding control areas apply to this section as well.

2.4.3.2, page 12, para. 2, 3rd bullet

The Plan states that the vegetation community will be characterized in areas "grossly impacted" by hazardous substances. The term "grossly impacted" must be clearly defined. Without a definition, ARCO is not capable of properly evaluating the work plan.

2.4.3.2, Injury Quantification

The Plan refers to "grossly injured vegetation", but no definition is given. Most likely, the greatest percentage of vegetation in the Upper Clark Fork Basin is not "grossly

"injured", and no description of how these areas will be treated has been given in the document. Furthermore, the State has not demonstrated in its Preassessment Screen or at any stage in its assessment any facts from which injury to wildlife can be inferred. Current wildlife population densities are consistent with available habitat and management practices. Thus, there is no justification for expending public funds on these studies.

2.4.3.3, page 13, Wildlife -- Injury to Consumers of Aquatic Biota, Determination and Quantification Phases

Background population densities is not defined. If the State intends to identify baseline conditions, then the Plan is additionally deficient in wholly failing to explain how baseline will be established historically or currently. Without a proper definition of baseline or a clearly defined method to describe baseline, the Plan is incomplete in a critical respect and cannot be appropriately evaluated. Injuries are to be assessed on the basis of reductions in wildlife populations in "impacted sites" compared with control sites. This methodology is appropriate only if the wildlife population levels can be accurately assessed and if the control sites are valid. The Plan does not address methodologies for confirming either predicate condition.

2.4.3.3, page 13, Wildlife -- Injury to Consumers of Aquatic Biota, Determination Phase, 3rd bullet

Exposure must account for time spent in impacted habitat, hunting success, bioavailability, and assimilation efficiency. Concentrations of hazardous substances in prey organisms do not provide these essential components to exposure analysis. Concentrations in prey also fluctuate with season and age.

2.4.3.3, page 13, Wildlife -- Injury to Consumers of Aquatic Biota, Determination Phase, 4th bullet

Literature on metals found in wildlife is unreliable in determining injury. This is because these values are collected from dead and dying animals--nothing is known about their previous exposure history or the cause of death. Moreover, there is no current evidence that wildlife populations are diminishing or affected within even those areas which the State characterizes as "highly impacted".

2.4.4.1, page 14, para. 1

In describing the selection of impacted sampling sites in upland areas, the Plan states that sites will be selected "where the natural plant community has been highly modified." However, no criteria or methodology for determining a "highly modified" plant community are described. Moreover, the State again fails to recognize that modifications in plant

communities can arise from a number of environmental stressors, including unfavorable soil moisture regime, water withdrawal or grazing that are unrelated to the presence of high concentrations of metals and, further, that high metal concentrations are not exclusively the result of mining or smelting activities. Yet, as has been noted, throughout Parts I and II of the Plan, the State assumes that mining or smelting activities are necessarily the cause of metals concentrations and/or changes in natural resources, incorporating into its Plan no method by which to confirm any mining or smelting activity, much less any such activity attributable to ARCO, as the cause of a change in or injury to any natural resource.

2.4.4.1, page 14, paras. 1 and 2 -

Natural resource damage regulations (43 C.F.R. § 11.31 (a)(2)) specifically require that the Plan specify sampling locations. However, the State fails to identify sampling locations for the impacted and control areas. In addition, the State does not indicate by what criteria it will determine how similar control sites must be to the impacted areas to be selected, or how the results of environmental sampling at a control site will be adjusted in the event that the best available control site is significantly different from its paired impacted site in one or more parameters.

The second paragraph of this section fails to indicate that soil and geological substrate characteristics must also be similar in "impacted sites" to control sites, particularly in upland areas.

2.4.5.1, page 14, para. 1

Table 2 of Part I presents a far too limited view of the existing data. In addition, the Plan must also include other historical data, recently available data and the data that will be forthcoming from remedial investigations and explain how those data will be coordinated with the proposed soil sampling.

2.4.5.1, page 14, para. 2, 5th bullet

Neither this section nor section 2.4.5.2 mentions nutrient quality, a critical consideration to the validity of any such protocol. Certainly plants would not be expected to grow as well in mine tailings as in organic-rich soil, yet this effect would not be wholly due to alleged hazardous substances.

2.4.5.1, page 15, "Injury Quantification - Uplands"

The use of the term "impacted riparian and upland areas" is not adequately defined geographically or by any other criteria. Therefore, it is meaningless and gives no guidance for purposes of comment. This discussion fails to specify

the number of samples to be collected as is required by 43 C.F.R. § 11.31(a)(2) to be included in the assessment plan. Also, the method for determining sampling locations cannot be evaluated without a listing of the number of soil sampling grids for impacted and control sites.

2.4.5.1, page 15, para. 5

As set forth above, the State's repeated use of "impacted area or site" is absolutely meaningless and of little value. Although the Plan states that 12 points in the "impacted area" (whatever that means) will be matched with control areas, the Plan fails to indicate the number of samples and method of sampling within control areas or the statistical method for comparing control and impacted areas. Since the assessment will depend on statistical comparison of control and impacted areas, the statistical method must be determined prior to designing the sampling strategy.

2.4.5.1, page 15, para. 6

The Plan fails to explain the relevance of the proposed investigation of erosional and depositional sites, including the hypotheses to be tested by such an investigation.

2.4.5.1, page 16, para. 1

~~Again, the Plan does not adequately describe the locations to be used for the assessment of injury to riparian lands.~~

Section 7.4.4.2 (1) of Part I of the Plan states that 18 reaches have been delineated in the Silver Bow Creek/Clark Fork River (SBC/CFR) drainage on the combined basis of valley bottom type and channel characteristics, although those reaches were not described. Just as the location of those reaches must be identified, the Plan must identify the segments of SBC/CFR that constitute the four (or more) reaches which will be used in the assessment of injury to riparian lands.

2.4.5.1, page 16, para. 2

If, as the Plan suggests, the entire length of SBC/CFR from Butte to Garrison is to be sampled on crossvalley transects spaced 100 meters apart, such an intensive sampling effort would violate the DOI regulations' requirement of cost efficiency and would indicate poor coordination with ongoing remedial investigation efforts (e.g., Streamside Tailings).

2.4.5.1, page 16, para. 3

The aspect of the sampling technique described here makes no sense as soil deposits cannot exhibit slickens and non-slickens conditions at the same time. Moreover, the Plan fails to define the term "post classification" or describe in any coherent way the criteria by which samples will be pooled.

2.4.5.1, page 16, para. 4

The rationale and method for selecting control areas for the riparian zones must be presented in more detail, including a statement of which characteristics (e.g., floodplain morphology; parent materials in watershed; disturbance by urbanization, transportation, agriculture, placer mining) will be examined for similarity, how strong the similarity between the impacted and control pairs must be, and how to adjust for any dissimilarities. All such factors must be addressed for each pair prior to collecting soil and vegetation data.

2.4.5.1, page 16, para. 5

The analytical methods for determining the soluble and exchangeable fractions of metals in soils are inadequately described. Specifically, reagents must be identified and procedures for extracting these fractions must be explained.

2.4.5.2, Vegetation Plant Residue Analysis

The State's plant residue study is to assess the concentration of metals in plant tissues at selected sites. The approach described may provide data on selected species, but will not provide a means for documenting the actual metals concentrations in the various habitats and vegetation types. Critical and missing from the State's plan is a method for determining how the existing biomass is

distributed among the various species and life form groups at each sampling location. Moreover, the Plan also fails to address how wildlife populations are utilizing the different habitats in order to determine how alleged metals concentrations in plant tissues may be affecting wildlife populations. As with any sampling, split samples must be made available to ARCO. Finally, there is no data that even imply that wildlife population have been impacted, and, thus, the critical first step in deciding whether that resource has been injured has yet to be taken.

2.4.5.2, page 17, para. 2

The Plan fails adequately to detail its sampling protocol. Simply specifying the collection of 100 to 500 grams of sample independent of sample type does not satisfy the regulations.

2.4.5.2, page 17, paras. 3 and 4

The Plan fails to describe any protocols or criteria for the photographic and qualitative assessments. If very carefully defined protocols or criteria do not exist and are not followed, the data obtained will be of little value.

Again, the Plan fails to provide any protocols or criteria for the examination or sampling of roots. Assessments of ..

roots on the basis of color and general morphology are subjective and of little value.

2.4.5.2, pages 17-18, Phytotoxicity Studies and Initial Evaluation

Tests

The phytotoxicity studies as they are designed will provide no insight into what is actually occurring with the species that occur in the areas allegedly affected by any releases of hazardous substances from mining activities. The studies are designed to be conducted under greenhouse conditions using species (lettuce and wheat) that are not present in the systems as they exist today. The evaluation tests are designed to be conducted with species that may not be tolerant of elevated metals concentrations and focus on testing the worst possible scenarios. Accordingly, it does not appear that these tests will produce relevant results.

2.4.5.2, pages 18-19, Extended Tests

The Plan fails to provide a sufficient level of detail on the methods proposed for the extended tests. For example, the Plan proposes using a dilution series of site soils, but it is unclear whether all sample points will be tested, or only those from areas determined to be "grossly impacted" (still undefined).

The extended tests for riparian sites do not test riparian sites, but, rather, test riparian species under greenhouse conditions. The Assessment Plan fails to specify what species will be used for these tests. The Plan states that Populus sp. cuttings will be used as a surrogate for cottonwood and willow (Salix sp.), but, if, as the Plan suggests, the Populus sp. cuttings will be used as a surrogate for both cottonwood and willow, the studies cannot be considered valid for the reasons stated below.

Using Populus sp. cuttings in both waterlogged and non-waterlogged conditions will produce invalid results.

The proposed sampling approach is also deficient because it fails to identify precisely which species of the genus Populus sp. will be used.

The specific protocols for conducting this phytotoxicity testing of poplar species using cuttings for purposes of riparian sites must be presented. Furthermore, the Plan fails to state how the two exposure conditions (waterlogged vs. non-waterlogged) will be related to conditions in the riparian areas of the upper Clark Fork as no investigations are proposed to document what portion of a cottonwood root mass is under waterlogged conditions for any specified period of time.

Also, the extended tests focus on species that are not important components of the existing vegetation within the study area. Data for alfalfa and Douglas fir will provide no insight into how the vegetation within the "impacted sites" provides wildlife habitat and certainly are not designed to provide a cause and effect relationship between hazardous substances and loss of habitat.

2.4.5.2, page 19, Vegetation Community Evaluation

The proposed comparison of impacted sites and control sites is deficient because important anthropogenic influences such as logging, grazing and construction have not been considered.

2.4.5.3, pages 19-20, Wildlife, Injury Determination - Wildlife Habitat

The proposed use of Habitat Evaluation Procedure (HEP) models, which are designed to assess only the structural aspects of habitats, is deficient because it will not reach the functional aspects of wildlife habitat and, thus, cannot provide an adequate basis for an assessment of injury to or loss of wildlife habitat.

The proposed comparison of impacted sites and control sites is deficient because no criteria for the selection of control sites are provided.

Furthermore, no statistical method to determine habitat loss between impacted and control areas is presented.

2.4.5.3, page 20, Injury Determination - Consumers of Aquatic Biota

The proposed assessment of relative abundance of the targeted species fails to take into consideration other sources of injury. The implied and invalid assumption that any differences between control sites and "impacted sites" are related to releases of hazardous substances from mining activities for which ARCO is responsible will fatally flaw the results of this sampling. Furthermore, no determination of injury to wildlife based on anything more substantial than an a priori assumption has been made. Thus, the critical threshold requirements for this part of the assessment is lacking which then leads to a waste of public monies.

The Plan fails to provide sampling or analytical protocols for the determination of residues of hazardous substances in great blue heron nestlings.

2.4.5.3, page 20, Task 1: Injury to Birds, 2nd bullet

There is no basis for the assumption that a given concentration of metal within an organ or whole animal is "sufficient to cause" any of the listed adverse changes.

Concentration alone does not take into consideration the

critical factors of time and pharmacokinetics of distribution. To date, no reliable determination of injury to any of these wildlife forms has been made to justify these studies.

The Plan fails to provide any specifics for the study to evaluate the presence of gross physiological abnormalities in great blue heron nestlings.

2.4.5.3, page 20, Task 1: Injury to Birds, 3rd bullet

The Plan fails to present any methods for measuring "physiological abnormalities". Also, it must be assumed that morphological, not physiological, was the intended adjective. Moreover, there is no justification for this kind of a survey with great blue herons on the CFR. There is no literature suggesting that metals cause teratogenic effects in birds, except for selenium, and mercury, neither of which is important on the CFR. If there are no indications of teratogenesis, there is no basis for this portion of the assessment, and, thus, it does not meet the reasonable cost requirement.

The simple determination of hazardous substance residues in prey fish does not accurately portray the physiological exposure of the predator species. All organisms have means for coping with the levels of arsenic, cadmium, copper, lead

and zinc that may be present in the bodies of the prey species. As there has been no determination of injury, these studies are a waste.

2.4.5.3, page 20, Task 1: Injury to Birds, 4th and 5th bullets
The implied assumption that there is a connection between residue concentrations in prey fish and changes in abundances in fish-eating birds is unreliable, as many other factors not related to metal concentrations contribute to changes in population abundance. These confounding factors must be thoroughly evaluated before this investigation proceeds, and evaluation of non-residue factors must be included in the study design.

2.4.5.3, page 20, Task 1: Injury to Birds, 4th and 5th bullets
Another fatal deficiency of this sampling protocol is that the most important factors to injury evaluations, the time spent feeding in the impacted area and species consumed, are not even recognized in this document. Moreover, metals analyses have already been performed on fish from the CFR and, thus, this sampling will not constitute a reasonable and necessary cost under the regulations.

2.4.5.3, page 20, Task 1: Injury to Birds, 1st and 5th bullets
Any environmental evaluation must recognize that the abundance of birds may have nothing to do with contaminants.

It is critical to include other factors such as temperature, exposure, traffic, noise, etc. For example, a State wildlife biologist who has managed the Warm Springs Ponds area for over 30 years was unable to identify any injury to wildlife as a result of metals toxicity. Indeed, he favorably compared Warm Springs Ponds to another noncontaminated wildlife sanctuary called Freezeout.

2.4.5.3, page 21, Task 2: Injury to Furbearers

The method proposed for determining injury to furbearers is fundamentally deficient because it does not contain a method for determining at the outset whether there has in fact been any adverse impact on the populations of aquatic or semi-aquatic furbearers at the sites and for the time period in question. Indeed, evidence accumulated to date indicates just the opposite.

The level of detail presented on the methods proposed for determining injury to furbearers is critically inadequate. For example, neither the methods of trapping and sampling furbearers nor the type of tissue to be sampled are described. Accordingly, the Plan is deficient in this regard as well, and it is not possible to comment on the appropriateness of these samples for determining injury. In addition, the Plan proposes sampling principal food items for hazardous substance residues but does not present a method

for verifying that these food items constitute a significant portion of the diet of the indicator species. And, no statistical method is presented for determining injury. A method for doing so must be determined prior to sampling to assure that relevant and appropriate data are collected.

2.4.5.3, page 21, bullet 5, Injury Quantification - Consumers of Aquatic Biota

The proposed methodology is also deficient because it fails to include other factors and contaminants in the injury evaluation.

2.5, page 21

Although the State is now planning additional sampling to support its assessment of injury to surface water resources, the proposed plan remains fundamentally inadequate. For example, the proposed plan fails to describe any modeling procedures or other method to assess the temporal and spatial distribution of allegedly injured resources.

2.5.1, page 22, Objectives of Research Plan

Part I of the Plan stated that the groundwater investigation would have a surface water component. Nowhere in Tasks 1 or 2 in this section or in Section 2.6 of Part II of the Plan (page 25) is there apparent coordination between the surface water and groundwater investigations.

2.5.1, page 22, Task 1

Other analyses must also be included in the assessment of injury.

2.5.2, pages 22-23, Task 1

This proposed sampling will not be fully representative of exposure because of the limited temporal perspective of the study, and, thus, its results will be invalid and unreliable. The selected sampling sites for the characterization of water quality/chemistry at IFIM sites in the CFR basin fail to include a significant section of the CFR between the Warm Springs Creek confluence and Deer Lodge. State fisheries population surveys have shown that this upstream section -- most proximal to alleged sources of hazardous substance releases -- supports the highest trout population densities in the CFR. The significant omission of IFIM and water sampling where the highest populations of trout reside in the CFR introduces a bias in the study program that misrepresents reality.

2.5.2, page 23, Table 2-1 and related text

The proposed sampling is also deficient because: reference sites are listed for comparison with results of sampling at SBC and CFR locations without precise specification of their locations; the text gives no description of how these reference sites were selected or the criteria used to

identify the specific areas that will be surveyed and sampled for fish populations; the reference area approach contained in the regulations implicitly indicates that a reference site should represent the allegedly affected area in every way except for the presence of the hazardous substance in question; the Plan fails to indicate that consideration and quantification of other factors known to influence fishery resources were taken into account in the process of selecting the reference areas.

2.5.2, page 23, text following Table 2-1

The State refers to QA/QC samples taken for purposes of validation. The State must review ARCO's extensive comments provided in regard to the QAPP in Part I of the Assessment Plan carefully to ensure that adequate documentation of these samples is made part of the project record, since no citation to specific sections of the QAPP are provided.

In addition, despite ARCO's request, the State has failed to provide a copy of the written Montana Natural Resource Damage Program standard operating procedures (SOPs) referred to in this paragraph (SOPs 2.0 and 3.0). ARCO cannot fully evaluate the appropriateness of the State's proposed sampling under this Plan until the written SOPs have been provided to and reviewed by ARCO.

At least two of the sampling episodes conducted to date have not been consistent with the stated protocol of collecting composite "validation" samples from multiple cross-sections at one station per episode.

2.5.2, page 24, follow-over text of Task 1

The Plan fails to provide a full reference to the FPM and the State has not provided them to ARCO for review in the context of their intended use.

2.5.2, page 24, para. 1

The State's method of collecting width-integrated composite samples deviates from standard U.S. Geological Survey sampling protocols, (e.g., Guy and Norman 1970). Therefore, the Plan must, but fails to, state the rationale for using the method it describes in this section.

2.5.2, page 24, Task 2

The State has not consistently collected duplicate grab samples during its high-flow spring sampling as is required in its own statement of protocols.

2.5.2, page 24, Task 3

The Task description refers to the use of "total recoverable metals" for the comparison with the EPA aquatic life criteria. ARCO's comments on the Preassessment Screen and on

the Assessment Plan, Part I addressed the inappropriateness of using total metal measurements as a basis for evaluation of injury to aquatic resources, and those previous comments are incorporated here by reference. Also, other critical measurements are not addressed in the Plan.

2.6.1, page 25

Although the State has eliminated the Thompson Park study, the Plan's continuing failure to explain adequately the rationale for using the wells selected, including whether they are of a sufficient distance upgradient of existing mining activities to be appropriate controls, whether water sampled from these wells will be analyzed for the same chemical constituents as proposed for Thompson Park, and what statistical criteria will be used to document a significant difference between the groundwater quality at control and allegedly "impacted sites", leaves the proposed groundwater sampling fundamentally flawed and deficient.

Moreover, the State must explain how surface water sampling in Blacktail Creek will be used in the evaluation of cross-media impacts now that the Thompson Park study has been discontinued.

- 3.0, pages 26-27

After reference to the relevant DOI regulations section, the Plan immediately reverts to a discussion of baseline levels in contaminated media and focuses entirely on chemical persistence. This narrow and biased approach allows any chemical not subject to transformation, degradation, or destruction to be considered to have an unacceptably long recovery period. The Plan appears wholly to ignore the factors of (i) ecological succession patterns and (ii) growth or reproductive patterns, life cycles, and the ecological requirements of biological species involved, both of which relate equally, if not more directly, to the natural resource services at issue in the Clark Fork River Basin.

Several of the conclusions reached in this discussion are unfounded, calling into question the objectivity of the analysis: First, the Plan's approach to preliminarily estimating natural recovery periods is fundamentally flawed by the apparent assumption that exposure to hazardous substances at any level constitutes an injury. There is a threshold for toxicity with all contaminants; contaminated soil and water do not necessarily expose biota to hazardous substances.

Second, the statement, ". . . all sources of hazardous substances in the Basin must be controlled before natural resources can return to baseline conditions," demonstrates a

very limited understanding of the transport and fate processes that influence chemical bioavailability, the relationship between elevated chemical concentrations and biological effects (and associated services), and the important distinction between the required level of remediation effort for major and minor sources of hazardous substances.

Third, the time for soil cadmium levels to reach background has little relevancy to biological recovery. The very slow uptake of cadmium is a perfect example of how meaningless soil concentration is to plant survival. Slow uptake is due to low bioavailability.

Fourth, the broad reference to "RI/FS documents" implies that this conclusion has been reached by many studies, yet only one remedial investigation (Tetra Tech 1987) is cited, and no feasibility studies are cited. Moreover, the State has represented that the RI/FS process will proceed for another decade (Assessment Plan, Part II at 27) and, thus, implicitly admits that its estimate of natural recovery periods are wholly speculative and that there is no basis for any recovery for natural resource injury.

Fifth, the Plan erroneously relates the persistence of elevated concentrations to the persistence of injuries for

purposes of the natural resource damage calculations. This flawed reasoning will result in irresponsible calculation of damages and development of inappropriate restoration alternatives. Determination of natural recovery must focus exclusively on the recovery of resource services to comply with the federal regulations. Many natural resource services (and injuries) will fully recover in the presence of elevated concentrations. For example, elevated concentrations of a metal in water (i.e., concentrations higher than ambient water quality criteria) may constitute an injury as defined by the regulations, but may not result in any loss in services provided by aquatic resources. Concentrations of metals in soils may be far in exceedance of background levels, but may not constitute an injury to vegetation.

Sixth and finally, this section wholly fails to consider that there have been substantial recovery in the vegetation and wildlife habitats within the region. The natural recovery of plant species in spite of the alleged current levels of metals in soils is an important factor that the Plan overlooks.

III. ECONOMIC METHODOLOGY COMMENTS.

4.1, pages 28-31

The economic damage determination design has at least five crucial deficiencies. Each of these deficiencies is discussed in more detail below.

The first crucial deficiency in the overall damage determination design is the inadequate identification and substantiation of the specific natural resources that are allegedly affected by releases of hazardous substances. The descriptions of natural resources in the Assessment Plan frequently are so vague that it is impossible to know which resources actually are being considered. Specifying the appropriate resources in an assessment is necessary to provide the starting point for identifying the potentially affected services to be quantified and valued. In many cases, the Assessment Plan does not consider the differences in publicly held natural resources and the services those resources provide. For example, wilderness areas will yield different types and levels of natural resource services than a state park. As discussed in the legal comments, the State

does not qualify as a trustee for privately owned resources such as land, vegetation, soils, etc. Thus, without a definitive description and the precise geographical location of those natural resources for which the State claims trusteeship, it is virtually impossible to frame any meaningful comments. It is self evident that private land owners can destroy habitat, limit access, discourage wildlife utilization and in other ways make unavailable to the public natural resources within their private ownership. Thus, the State must, but has not, taken into consideration these limitations in performing its assessment.

An important aspect of designing an effective damage assessment is to clearly delineate the potentially affected services. (See 51 Fed. Reg. 27686.) The second crucial deficiency is the proposed Assessment Plan's failure to meet this criterion. Some examples of the inaccurate delineations of categories include:

- listing sediments and soils as separate categories from surface water,
- listing fisheries as separate categories from surface water and sediments, and
- listing vegetation as a separate category from wildlife.

The overlaps in services provided by each of these categories result from a major failing of the Assessment Plan as a whole namely, it focuses on specific resources rather than the services those natural resources provide. The DOI regulations properly recognize the importance of services in the design of an effective assessment plan. (See 43 C.F.R. § 11.17.) As the regulations describe in some detail, the proper delineation of services is necessary to eliminate the overlaps between the resource categories such as those included in the State of Montana's economic damage determination design. For example, vegetation provides services such as food and habitat for wildlife. If contamination injures vegetation sufficiently to reduce food and habitat for wildlife, then damages would be based solely on the reduction in wildlife services to the public (if any have occurred). It is not appropriate to evaluate the effects of injuries separately for vegetation and wildlife, as is implied in the Assessment Plan. This overlap will cause damages to be double counted, which is clearly prohibited by the DOI regulations. (See 43 C.F.R. § 11.84 (c).)

Moreover, the failure to clearly delineate natural resource services creates significant problems for the measurement of restoration costs. As discussed below, this failure will lead to an overstatement of potential restoration costs.

The third crucial deficiency in the Assessment Plan results from the failure of the State of Montana to consider the effects of remediation and clean-up activities on alleged future injury and consequential damages. The DOI regulations explicitly state that future damages are limited to the residual injuries that remain after clean up and remediation have been completed. The interim activities that have been completed at the Mill-Willow By-Pass site demonstrate the importance of this principle. These activities have significantly reduced the potential of future releases in this area. In a relatively short period of time, these activities will lead to substantial increases in the natural resource services that are provided in this area. Another significant example is the pilot restoration project in the upper Clark Fork to improve stream access conditions, and to enhance the wildlife habitat in the area. The correct measurement of potential future damages should only consider the residual injury, if any, that remains after remediation activities, such as those described above, are completed. On a related issue, the Assessment Plan fails to identify the time period over which damages will be measured and how the State will take into account, over time, remediation and cleanup activities.

The fourth crucial deficiency in the overall damage determination design is that it proposes to use an unreliable method to measure damages. Specifically, the Assessment Plan proposes to use the contingent valuation method (CVM) to measure all categories of potential damages. The Assessment Plan provides no details on how estimates from this method will be compared with other methods, and it fails to show that the method is reliable. As we discuss later in these comments, several recent studies have shown that contingent valuation estimates of nonuse values are unreliable for use in natural resource damage assessments. (See Diamond and Hausman, 1992, Diamond, et al., 1992, McFadden and Leonard, 1992, Desvouges et al., 1992, and Cummings and Harrison, 1992.) These studies are directly relevant to the types of alleged losses in natural resource services in the Clark Fork area.

The fifth problem in the overall design is that it does not provide for sufficient safeguards to eliminate double counting that will result from using multiple measurement methods. For example, the design calls for using three different methods for measuring the value of any potentially foregone recreation services: travel cost models, unit-day value methods, and contingent valuation. The DOI regulations recognize that when multiple methods are used for any damage

category double-counting is a serious concern. (See 43 C.F.R. § 11.84(c).)

To avoid double counting from multiple methods, three criteria must be met:

- the basis for measuring the losses must be the same with all the methods;
- the sampling and survey plans must be designed to ensure comparability;
- the analysis procedures must be designed to eliminate overlaps between methods.

The Assessment Plan for the Clark Fork sites meets none of these criteria. The economic damage determination design also fails to note that the unit-day value method is not independent of either the CVM or travel cost methods, since the unit-day method typically relies on values collected with either the CVM or the travel cost method. The unit-day value method also fails to address specific site characteristics and substitution opportunities in the valuation estimate.

Finally, the Assessment Plan calls for using both market price and contingent valuation methods to measure potential damages to both surface water and groundwater. This duplication is unnecessary for three reasons:

- the contingent valuation (CV) estimates will not be valid;
- even if they are assumed to be valid, there is no way to reliably separate the groundwater and surface water component of the CV estimates so that they can be compared;
- economists prefer market data whenever it is available.

Accordingly, using the CV method for surface water and groundwater is unreliable, redundant and unnecessary.

4.2.2, pages 31-32

The restoration portion of the Assessment Plan has serious deficiencies. The most troubling deficiency stems from the lack of understanding of the economic principles underlying the concept of restoration. As noted earlier, when evaluating restoration alternatives, it is critical to focus on the services provided by the resource, not on the resource itself. It is these services that must be restored, not the physical characteristics of the resource. (See 43 C.F.R. § 11.81.) The value of any asset, such as a natural resource, is based on the welfare that people receive from the asset, which depends on the uses and other services provided by that asset. The physical, chemical, and biological properties of

the natural resources will affect the uses of the resources and the other services the resources provide people, but people value the resource services (whether use or nonuse services), not the properties of the resources per se. The various properties of the resource can be viewed as characteristics of the resource services. As such, people would value services with more desirable properties more highly than those with less desirable properties. However, they do not value the properties separately from the services. Services, therefore, are the basic unit of measurement for valuing an asset (and valuing changes in an asset) such as a natural resource.

A restoration approach that focuses on the resource itself may lead to an inefficient use of society's resources. For example, counting and replacing the types of plants lost as a result of an injury could lead to inefficient restoration activities from society's point of view. Specifically, it would ignore the possibility of restoring the lost habitat services in the most cost-effective manner. The habitat services could possibly be restored by changing the way the resource is managed, or by providing a less expensive type of vegetation cover that would provide suitable habitat. The same would likely be true for recreational services where cost-effective restoration might focus on improving recreational access to the resource (by building a boat ramp

or an access road, for example) or finding other ways to enhance the productivity of the resource (e.g., implementing a restocking program to restore fishing services or expanding the waterfowl habitat in the Warm Springs ponds) rather than restoring the physical characteristics.

In addition, there is no economic rationale for restoring both resources and services, as suggested by the Assessment Plan. When resource services are restored to the level that they would have reached without the injury, society's well-being is returned to the level that it would have reached had the injury not occurred.

4.2.2, pages 32-33

The Assessment Plan lists the 10 factors from Section 11.82(d) of the proposed revision to the DOI regulations that Trustees should consider in selecting one or more restoration alternatives. Some of these factors have more importance than others for selecting the best restoration alternative. The Assessment Plan does not discuss how these factors will be used by the Trustees.

A structured decision process is required to select the most desirable restoration alternative. This structured decision process organizes the factors listed in Section 11.82(d) in a logical manner that is more likely to yield decisions that

improve society's well-being. Specifically, a list of possible restoration alternatives should be reduced to a list of "relevant" alternatives, all of which are technically feasible (Factor 1) and consistent with applicable Federal and state laws and policies (i.e., Factor 10). In addition, all "relevant" alternatives should take into account the results of any actual or planned response actions (Factor 4).

The most cost-effective (Factor 3) alternatives and/or the alternatives providing the greatest net benefits (Factor 2) should then be selected from the list of relevant restoration alternatives. In economics, the "maximize net benefits" criterion is the preferred basis for making socially optimal decisions. In this framework, society would choose the restoration option that provides the greatest net benefit to society--that is, the one that has the largest differential between the benefits society gains from the action and the cost of the action.

The maximize-net-benefits criterion is sufficiently broad-based to accommodate all the other factors that DOI has listed in the proposed regulations. For example, the determination of net benefits should take into account:

- potential for additional injury resulting from the relevant actions, including long-term and indirect impacts, to the injured resource or other resources (Factor 5),
- the natural recovery period (Factor 6),
- ability of the resource to recover with or without alternative actions (Factor 7),
- acquisition of equivalent land where restoration, rehabilitation, and/or other replacement of land is not possible (Factor 8), and
- potential effects of the action on human health and safety (Factor 9).

With the maximize-net-benefits approach, each of these considerations can be classified as either a benefit or a cost. This consistent categorization of the relevant factors enables them to be integrated into one common framework.

There is sufficient precedent for requiring the maximize-net-benefits criterion be used. (See in particular the Water Resource Council's Principles and Guidelines (1983) and Executive Order 12291 (1981) on Regulatory Impact Analyses, both of which DOI itself has followed in the past or is currently following for major regulations.) Given the potential consequences of restoration decisions, the State of Montana should use the maximize-net-benefits criterion to

select the preferred restoration alternatives in the natural resource damage assessment for the Clark Fork sites.

The proposed Assessment Plan has the trustee selecting one or more restoration alternatives before determining the value of the alleged foregone natural resource services resulting from the claimed injuries attributable to the alleged releases. Since the benefits of restoration actions are based on the reduction in the value of natural-recovery service losses as a result of these actions, restoration actions should be selected after the determination of damages under natural recovery. Otherwise, the trustee cannot properly evaluate the costs and benefits of the relevant restoration alternatives.

In addition, the Assessment Plan makes no mention of the "grossly disproportionate" test that the Court of Appeals in the Ohio decision (880 F.2d 432 (D.C. Cir. 1989)) said should be applied in natural resource damage evaluations. Before a restoration alternative is selected, the trustee must first determine if the costs of that alternative are grossly disproportionately larger than the lost value of the resource services. Therefore, the value of the foregone services must be determined before selecting a restoration alternative.

The Assessment Plan claims that previous studies of the upper Clark Fork River show that the use and value for the mainstream upper Clark Fork fishery is well below that of the other major trout streams in the basin. First, the Duffield and Allen (1988) study found that several Montana rivers have lower trout fishing values than the Clark Fork River. Second, this evaluation makes a crucial and flawed assumption that has important implications for both the design of the assessment and the ultimate measurement of damages. Specifically, it assumes that the upper Clark Fork river is comparable in all of its features to other major trout streams. This assumption is inconsistent with the "with-and-without" criterion that economists' use to measure natural resource damages. (See 43 C.F.R. § 11.81(c).) The with-and-without criterion compares the level of recreation services with and without the alleged hazardous substances in the Clark Fork River. (This criterion would also apply to other resources in the Assessment Plan.) Accordingly, the studies proposed by the Assessment Plan for recreational fishing services, or any other type of services for that matter, would have to control for the site characteristics that are independent of hazardous substance releases.

The assumption that the Upper Clark Fork River is comparable in all of its features to other major trout streams has an additional weakness that is likely to bias the damage

assessment. Specifically, it assumes that the relevant substitutes to be considered in the demand analysis are major trout streams. This assumption ignores at least three important dimensions of substitution: people may consider fishing for something other than trout as a substitute for trout fishing, other non-fishing forms of recreation may be substituted for trout fishing, and non-recreation activities also may be substituted for trout fishing. The failure to properly address substitutes will bias the measurement of damages. (See Kopp and Smith, 1989, and Smith and Kaoru, 1990.)

The Assessment Plan continues to make these significant analytical errors for other sites. For example, the evaluation of recreation in Silver Bow Creek compares recreation use with other small streams for selected years. This comparison ignores other external factors that affect recreation in a given season for a specific recreation site.

4.3.2, pages 33-34

The stated objective of the Assessment Plan is to relate changes in the fish stock in affected water bodies to changes in recreational fishing participation and valuation. This objective implies that the changes in fish stock can be linked exclusively to the alleged hazardous substance releases. This assumption ignores other factors, such as

water flow and temperature, that may affect changes in the fish stock, and are independent of any hazardous substance releases. This assumption again violates the basic with-and-without criterion described above. Furthermore, the Assessment Plan does not explain how changes in fish stocks will be determined.

4.3.3.1, page 34

Several important problems can arise in using existing data in natural resource damage assessments. The Assessment Plan fails to recognize these problems, which significantly undermines the plausibility of the strategy for using existing data.

First, flaws in the existing studies can lead to erroneous conclusions, which will bias decisions made in any damage assessment relying upon data from these studies. For example, problems in the sampling design could lead to a sample of respondents that are not representative of the recreators in Montana. These problems include non-random sampling strategies, non-response bias, and multiplicities among the sampling populations.

Second, flaws in the economic analysis that is performed with the existing data can lead to incorrect conclusions. For example, travel cost models are frequently estimated without

substitutes being included in the model. As is noted in the Assessment Plan, omitting substitute sites biases any estimate of consumer surplus that is developed based on the model.

Third, the designs of the existing studies may be too specific to be useful for broader needs of a natural resource damage assessment. For example, recreation use studies may be interested in measuring the value of uses in specific management areas. These areas may not be relevant for damage assessment purposes.

Fourth, existing studies will have different research objectives and designs that may not be comparable. For example, a wildlife study may be trying to address different management needs than an angler study. These needs lead to particular research designs that may not be compatible, or at a minimum make it very difficult to compare across studies.

4.3.3.2, pages 34-37

In principle, the multi-site travel cost models that are described in the Assessment Plan represent a sound approach to measuring recreation use losses. The more sophisticated versions of the models allow for the inclusion of substitute sites in the model. These models require extensive data that

must be carefully developed and very sophisticated modelling that must be carefully performed.

However, the Assessment Plan contains severe deficiencies in the proposed implementation of the travel cost models. These deficiencies are described below.

First, the basis for selecting sites that will be included in the survey is inadequate. The proposed survey design is unlikely to produce a representative sample of either visits or visitors using the proposed survey design.

Representativeness is required in order to be able to generalize from a sample to the population as a whole. It is a basic requirement for any scientifically sound study.

Second, the proposed intercept surveys will be done during the summer months. Thus, the State will have no basis for measuring usage during the other months of the year. Any attempts to estimate annual usage will be biased because the summer months typically have higher usage than other months.

Third, the proposed follow-up survey is likely to yield biased results for several reasons. First, some participants will refuse to participate in the follow-up survey at the outset. Secondly, some recreationists will not return their completed recreation survey forms. It is quite likely that

the lower usage recreators will not return forms because they are less interested in fishing. Dillman (1978) explains that recipients of a mail questionnaire have a higher likelihood of responding if they are interested in the topic.

Developing estimates based on the responses of the recreators who return the forms will lead to higher estimates of usage.

Additionally, there is a substantial potential for recall bias in the follow-up survey if the time period covered by the questionnaire is too long. A recent evaluation of the National Hunting and Fishing study shows that recall bias can be a serious problem in recreation studies. (See Chu et al., 1989.) Also, the Assessment Plan indicates that respondents will be asked about recent trips. This strategy for addressing recall bias problems can lead to a separate type of bias if the recent trips are not representative of the entire year. Given that fishing is a seasonal activity in most instances, it is quite likely that recent trips will not be typical of trips for an entire recreation season.

Fourth, the Assessment Plan does not address specific issues that relate to using travel cost models that have been identified in the professional economics literature. These include the following:

- the measurement of the opportunity cost of time, which is used in calculating the implicit prices in the modelling analysis; (See Smith, Desvouges, and McGivney, 1983; Shaw, 1992.)
- the role of multipurpose trips, which leads to biased estimates of losses because people spread the costs of a trip over several sites. This is especially problematic for out-of-state visitors who may be travelling long distances but visiting many sites and engaging in several different recreation activities; (See Haspel and Johnson, 1982.)
- the choice of site characteristics to be included in the model and the appropriate measurement of those characteristics; (See Russell and Vaughn, 1982.)
- the relationship between people's perceptions of site quality and technical measures of quality. (See Bockstael, Hanemann, and Strand, 1987.)

4.3.3.3, pages 37-38

The Assessment Plan proposes using a contingent valuation question within the follow-up fishing survey. This portion of the survey will suffer from the same sampling problems listed above. In particular, the sample is likely to be unrepresentative because heavy recreators are more likely to

return the survey. Additionally, the Assessment Plan provides no documentation on how this question will be developed and why adding such a question will improve the assessment. Given the problems associated with the design of the recreation portion of the Assessment Plan, and the unreliability of CVM to measure economic value and particularly an individual's hypothetical willingness to pay, there is no economic justification for adding this component to the design.

4.4.3, pages 40-41

The Assessment Plan proposes to use a benefits-transfer (or unit-day value) technique to measure the values of non-fishing recreation in the area. This technique involves using existing studies to assign values to a different resource. While this technique can be useful in some situations, several problems must be addressed. The Assessment Plan makes no mention of any of the following problems associated with the benefits transfer technique.

First, in order to apply existing unit-day values to a population, the relevant population must be determined. Many studies make assumptions about the size of the geographic market that are not based on any empirical evidence. Overstating the actual size of the market will produce a

biased estimate of damages, which will exceed the actual damages. (See Smith, 1992.)

Second, once the geographic market is established, participation rates are used to determine what portion of that population participates in any given recreational activity. The Assessment Plan proposes to use a 13 year old study as a basis for these participation rates. However, the Assessment Plan does not indicate if any analysis of changes in the size and composition of the population, tastes and preferences, or characteristics of the sites will be performed to ensure that the use rates from a 1979 unpublished Master's thesis are even relevant, much less valid. (See Freeman, 1984.)

Third, when transferring values from a study of one resource to the resource in question, it is quite possible that the characteristics of the resources will differ. For example, the sites can have different technical characteristics (water quality, species availability, river flow, accessibility, climate, scenic qualities), or they may provide very different services. Also, the number of substitute sites available to recreators greatly affects the value of a site. If there are large numbers of substitutes, then any one site is worth less because recreators have other opportunities. When transferring values, the degree of substitutability must

be comparable between the two resources. The Assessment Plan fails to address these crucial issues entirely.

Fourth, deficiencies in the survey design of the original study will be transferred with the unit-day values. The analyst must evaluate the quality of any study before using results from it. Key points to be evaluated include: the sampling strategy, the development and testing of the questionnaire, the quality control performed on the data, and the rigor of the statistical analysis. Deficiencies in these facets would invalidate the study's results.

Since there is so much uncertainty involved in using unit-day values from studies of other resources and so many assumptions must be made, it is not appropriate to develop a point estimate of values. Instead, some sensitivity analysis must be performed. This analysis will result in a range of possible values. The dispersion of this range will reflect the degree of uncertainty in the analysis. The Assessment Plan does not specify what alleged injuries are to be measured, how those injuries will be identified, whether those alleged injuries resulted from the release of hazardous substances and how those alleged injuries will be used as a predicate for any claimed damages.

The Assessment Plan also proposes to use comparable sites to determine the effects on the Clark Fork River area. However, the Assessment Plan does not indicate how these comparable sites will be selected. These sites need to have all the same characteristics as the Clark Fork, except for any effects of hazardous substances. If the comparison sites do not have the same characteristics and uses as the target site, the comparison will be flawed.

The Assessment Plan indicates that in-field observation of non-fishing activity will be performed concurrently with the fishing observation and creel survey. However, the fishing and creel surveys will be completed in the summer months. Therefore, no activity undertaken in other months will be observed. Given the different kinds of outdoor recreation, ignoring the other months may seriously bias the results. Also, non-fishing recreation may take place in different areas and at different times of day than fishing recreation, so some non-fishing recreation may be missed by this approach.

More importantly, the Assessment Plan proceeds from the unfounded assumption that there have been injuries to wildlife, including elk and deer, when the State's own data indicate that wildlife populations are consistent with current management practices and baseline habitat conditions.

In addition, the Assessment Plan does not describe any details on the implementation of this in-field observation. A sampling plan is needed to determine what sites will be sampled, what time of day the sampling will take place, and what activities will be sampled. Without a statistical sampling plan, no generalizations to a larger population can be made. The State's failure to provide such critical and minimum information hampers ARCO's ability to provide meaningful comments.

The Assessment Plan states that 100 - 150 individuals will be selected for a non-fishing survey. There are several problems with this approach. First, even if the response rate is 70%, which is extremely high for a mail-back survey, the final sample size will be 70 to 105 respondents. That size is far too low to generalize to any larger population. In addition, these individuals will be sampled during the in-field creel survey. Therefore, the population available to be sampled will only be non-fishing recreators who are near fishing sites during the time of year and time of day that anglers are fishing. This group of people may not represent all non-fishing recreators in the Clark Fork area. If not, any results from this survey effort will be seriously biased.

The Assessment Plan proposes a small survey of non-fishing recreators that will ask how changes in site characteristics would change recreation decisions. These contingent behavior questions are unreliable because recreators have to be able to predict how they would respond in the future without knowing all the factors that would influence their stated behaviors. For a plethora of reasons people do not follow through on their stated intentions. Moreover, the recreators are unlikely to be able to determine how their behavior would change in response to only the changes in the site characteristics that would be associated with hazardous substance releases. A Summary of NERA's Adjustment to Plaintiffs' Recreation Damage Estimates (1987).

4.5.2, page 42

The proposed CV component of the Assessment Plan fails to meet minimum criteria of reliability for inclusion in a damage assessment. The Ohio decision requires that only reliably calculated damages can be considered in a damage assessment. (See 880 F.2d 464 (D.C. Cir. 1989).) Recently, several studies have shown that the values elicited by CV surveys do not meet minimum criteria for accuracy, making the method unreliable for use in a natural resource damage assessment to measure total values, as proposed by the State of Montana.... These studies have noted both theoretical and

empirical problems that prevent CV from providing accurate estimates of damages.

Specifically, Desvouges, et al. (1992) show that stated willingness-to-pay (WTP) values do not increase as the level of environmental protection increases for two different commodities. They also show the implausible result that more than 30 percent of respondents state that they would agree to pay more than \$1,000 per year to reduce the environmental effects of small oil spills. This study used large samples with careful experimental controls to test for reliability. Based on the results of these experiments, the authors conclude that CV is not reliable for measuring the types of damages that the State of Montana proposes to measure in its Assessment Plan.

Also, Diamond, et al. (1992), utilizing CVM estimated the value of a commodity that is geographically close to the Clark Fork River site, namely, wilderness areas in Colorado, Idaho, Montana, and Wyoming. In that study, they find that the stated WTP values for the wilderness areas do not satisfy a basic premise of economics. When they elicit values for three wilderness areas individually, the sum of those WTP values substantially exceeds the WTP elicited for the three areas as a whole. These authors conclude that CV does not

measure economic preferences, making it unreliable for use in measuring natural resource damages.

McFadden and Leonard (1992) using the same wilderness area commodity as Diamond, et al., in another study, also find that CV responses fail several key tests of reliability. First, they find that the responses are very sensitive to the format of the WTP question. Double-bounded dichotomous-choice surveys result in very different responses than open-ended questions. They also find that the double-bounded dichotomous-choice responses significantly depend on the starting bid offered to the respondent. The higher starting bids result in higher WTP estimates, making CV unreliable in damage assessments because researchers can alter the WTP estimates by their choice of the offer bids. The authors conclude that CV does not measure preferences, and therefore it is unreliable for use in damage assessments. (Similar results are also found in the Desvouges, et al. (1992) study for a different nonuse commodity.)

Cummings and Harrison (1992) in a recent literature review reach the following conclusions about CV:

- there is no evidence to support the unequivocal claim that CV enjoys a strong theoretical foundation;

- there is no basis for the conclusion that CV subjects have, or do not have, incentives to truthfully reveal their preferences;
- typical applications of CV may not allow subjects sufficient time to search their preferences;
- the kinds and amounts of information provided in a CV survey can significantly affect the reported values;
- subjects may not consider relevant substitutes and complements.

Economists have described similar deficiencies in using CV for measuring natural resource damages. (See Cicchetti, 1991 and Desvouges and Dunford, 1991.)

4.5.3, page 43

The Assessment Plan contains several severe deficiencies in its design that will yield unreliable estimates of damages. Specifically, the alternative scenarios presented in the Assessment Plan do not describe the affected resource services. For example, the Assessment Plan does not discuss how substitute services for the Clark Fork will be included in the scenarios. The Department of Interior regulations indicate that any potential for damages will be affected by the existence of substitute services.—(See 43 C.F.R.—

§ 11.84(f).) Regardless of other deficiencies in the design, the failure to address substitutability in the Assessment Plan's CV study will yield unreliable and unrealistic estimates of damages.

In addition, the Assessment Plan provides no details on how the commodities will be described in the CV survey. Kemp and Maxwell (1992) show that the way a particular commodity is described can dramatically affect the WTP values. Specifically, by asking for the value of a broad commodity, such as environmental protection, and then having the respondent disaggregate that value for smaller commodities, the resulting value for the final level is strikingly (several magnitudes) smaller than if the final level is the only level asked. The Assessment Plan does not address this problem.

Also, the Assessment Plan does not include an evaluation of hypothetical versus actual values. That is, would people really pay the amounts they indicate in a contingent valuation survey? Cummings and Harrison (1992) review the hypothetical-versus-actual studies that have been performed and find that for anything other than very familiar private goods, CV elicited WTP values do not accurately reflect how much people are actually willing to pay. The Clark Fork River and the other natural resources allegedly injured by

hazardous substances cannot be considered familiar private goods.

4.5.3, page 44

The Assessment Plan also is deficient in that it fails to consider how the relevant market will be determined for the Clark Fork sites. Clearly, the definition of the relevant market will have a substantial effect on total damages. (See Smith 1992, and Cummings and Harrison, 1992.) As Smith (1992) notes, the definition of the relevant market has to consider both the geographic scope as well as the nature of the resource services in question. It is essential for these considerations to include the relevant substitutes for the potentially affected services in the Clark Fork area.

Finally, Cummings and Harrison (1992) point out that the survey results are often biased because of sampling related biases. In particular, they show that the final sample of respondents used in many CV surveys are not statistically valid samples. These sampling problems are further exacerbated by the large percentage of outlier and protest bids that frequently are found in CV surveys. The Assessment Plan fails to address these crucial implementation issues.

4.6.1, page 44

The State's "example" statements relating to groundwater and to surface water incorrectly assume that injury to a resource results in reduction of the services of that resource. The State ignores the fact that any alleged injury to groundwater or to surface water may not preclude, limit or reduce the services of those resources. Accordingly, if there is no loss in services, there will be no damages. Moreover, the measurement of any alleged damages must be restricted to committed uses. (See 43 C.F.R. § 11.84(b)(2).)

4.6.2, page 44

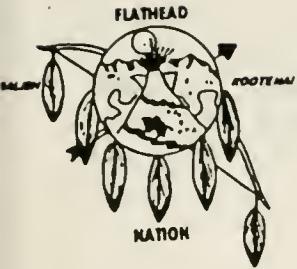
Given the other damage assessment studies described in previous subsections, the market price approach to quantify compensable use value damages will double count damages claimed to result from alleged injuries to certain natural resources. The DOI regulations explicitly prohibit double recovery of damages. (See 43 C.F.R. 11.84(c).) Whenever the market price approach and non-market price approaches lead to double counting damages, the non-market price approach should not be used because the market price approach provides the most reliable damage estimates. Furthermore, the Assessment Plan indicates that the market price approach will be used "if deemed appropriate," without explaining or listing the criteria for determining the appropriateness of this approach.

4.6.3, page 46, 1st para.

Damages involving "expected future designated uses or service flows" are only relevant for committed uses of the injured natural resources, as specified in the DOI regulations (43 C.F.R. § 11.84(b)(2)) and upheld in the Ohio case. (See 880 F.2d 432 (D.C. Cir. 1989).) The phrase "absence of limitation on use" needs to be explained or clarified. The second step in the described procedure does not acknowledge that any reduction in service flows must be based on a with-and-without comparison. As specified in 43 C.F.R. § 11.72(b), any reduction in service flows must be based on the difference in service flows with the injuries attributable to the releases and the service flows that would have occurred without the injuries attributable to the releases (i.e., baseline service flows). For sites involving releases over many years, it will be very difficult to establish realistic baseline service flows. In such cases the DOI regulations allow the use of "control areas" to establish the baseline service flows (43 C.F.R. § 11.72(d)). The Assessment Plan does not specify how reduced service flows will be measured, whether "control areas" will be used for the damages measured using the market price approach, and how "control areas" will be identified and selected. Finally, the Assessment Plan does not explain how market prices will be "evaluated and applied" to the reduced uses of the resource.

4.6.3, page 46, 2nd para.

The first two sentences demonstrate double counting of resource uses, since the first sentence refers to evaluating "potential and actual uses" and then "past, present, and expected future use" is evaluated according to the second sentence. The Assessment Plan does not demonstrate that "sustainable annual yields of the resource for designated uses" are the appropriate baseline for the comparison with actual service flows. (See the previous comment for an explanation of the proper approach for establishing baseline service flows.) As noted above, the Assessment Plan does not explain or describe the basis for evaluating or applying the listed "alternative market price based approaches."



THE CONFEDERATED SALISH AND KOOTENAI TRIBES OF THE FLATHEAD NATION

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NATURAL RESOURCE
DAMAGE PROGRAM

July 11, 1994

Joseph E. Dupuis - Executive Secretary
John L. Clairmont - Executive Treasurer
Erica Hewankom - Sergeant-at-Arms

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Henry "Hank" Baylor
D. Fred Matt
Donald "Donny" Dupuis
Mary Lefthand

Mr. Robert Collins
Natural Resource Damage Program
Old Livestock Building
1310 East Lockey Avenue
Helena, MT 59620

Dear Mr. Collins:

The State of Montana's Natural Resource Damage Program has issued Part III of the Natural Resource Damage Assessment Plan for the Clark Fork River NPL Sites (Hereafter Part III). This Plan does not address injuries to natural resources subject to Confederated Salish and Kootenai Tribes' trusteeship. To the extent that Montana's Plan impinges upon those resources and/or services, however, the Tribes offer the following preliminary comments for the State of Montana's information and consideration.

There are six assessment tasks for additional data collection identified in Part III, and they include temperature and dissolved oxygen monitoring; trout population surveys and analysis of trout gut contents; dissolved organic carbon analyses; and periphyton analyses. The purpose(s) for which these additional data gathering activities are being undertaken and the use to which the collected data will or may be put are not clearly stated in Part III. Unless these purposes and uses are clearly identified and discussed in Part III, assessments by the Tribes about the appropriateness and/or adequacy of the proposed data collection design and the formulation of substantive comments are frustrated.

For each Task identified in Part III, the specific purpose for which the task is being undertaken should be clearly stated, and the specific uses to which the collected data will be put should be provided. Once this information is made available, assessments of the usefulness of the proposed study design may be undertaken and comments submitted, if appropriate.

Examples of the kinds of information necessary to evaluate the proposals presented in Part III are shown below for the proposed Tasks.

TROUT POPULATION SURVEYS.

Three tasks are identified which will be conducted to evaluate seasonal (Task 1) and annual (Task 2) influences on trout populations. It is not clear from Part III what data are lacking about seasonal variations in populations. Consequently, it is not possible to determine if the proposed tasks will provide the information necessary to fill the data gap. Why is it necessary to evaluate seasonal variation in trout populations? The State has already made estimates of damages based on presently available data.

Why will the proposed design suffice to evaluate seasonal variations? Why is it not necessary to sample during the period October - May? Why were the reaches near Racetrack Creek, Little Blackfoot River, Flint Creek and Rock Creek and their reference stream reaches chosen instead of other reaches?

Task 3 will be conducted to compare two fish population estimating methods: snorkeling and electro-fishing. Why is it necessary to compare the methods? Why is the proposed design considered sufficient and appropriate for the comparison?

TEMPERATURE AND DISSOLVED OXYGEN MONITORING.

What are the specific questions which these data are to be used to answer? How will these data be used in answers to these questions, and why is the proposed design considered sufficient for these purposes?

ANALYSIS OF TROUT GUT CONTENTS.

What are the specific questions about hazardous substances in trout gut contents which are to be answered? How will the data collected under the design in this task be used to answer these questions?

COLLECTION OF SAMPLES FOR DISSOLVED ORGANIC CARBON.

What is meant by "characterize" dissolved organic carbon? Why is it necessary to characterize dissolved organic carbon in the Clark Fork River but not in the reference streams? Why is the characterization not required except during August low flows?

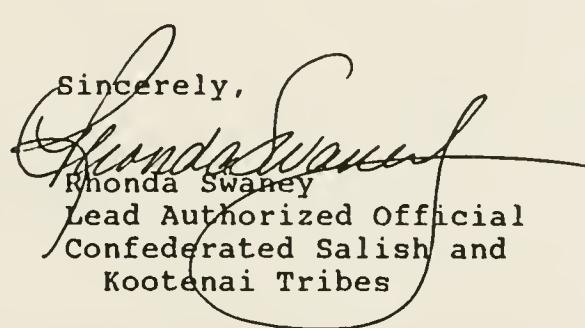
PERiphyton ANALYSIS OF RIFFLE ENVIRONMENTS.

How will these data be used?

Mr. Robert Collins
July 11, 1994
Page -3-

We look forward to being advised of the purposes for which the tasks identified in Part III are being undertaken and the uses to which the collected data will be put. Once this information and the answers to the above questions are received, the Tribes may submit comments, as appropriate.

Sincerely,


Rhonda Swaney
Lead Authorized Official
Confederated Salish and
Kootenai Tribes



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Richard O. Curley, Jr.
Senior Attorney

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NATURAL RESOURCE
DAMAGE PROGRAM

July 15, 1994

VIA EXPRESS MAIL

Mr. Robert G. Collins
State of Montana
Natural Resource Damage Program
Old Livestock Building, 1310 East Lockey
Helena, Montana 59620

Re: Atlantic Richfield Company's Comments on the State of Montana's Assessment Plan, Part III, Clark Fork River Basin NPL Sites.

Dear Mr. Collins:

The enclosed comments on the State of Montana's Assessment Plan, Part III, Clark Fork River Basin NPL Sites are submitted on behalf of the Atlantic Richfield Company ("ARCO"). ARCO respectfully requests that the State revise the Assessment Plan in accordance with these and ARCO's prior comments. If you have any questions regarding ARCO's comments, please contact me.

Sincerely,

Richard O. Curley, Jr.

INTRODUCTION

These comments are submitted on behalf of the Atlantic Richfield Company ("ARCO") on the State of Montana's "Assessment Plan: Part III Clark Fork River Basin NPL Sites, Montana" dated June 1994 (the "Assessment Plan: Part III"). These comments follow prior comments ARCO has submitted to the State at various stages of the assessment process. On November 25, 1991, ARCO submitted extensive comments on the State's October 1991 "Preassessment Screen: Clark Fork River Basins NPL Sites, Montana." On March 16, 1992, ARCO provided comments on the State's January 1992 "Assessment Plan: Part I Clark Fork River Basin NPL Site, Montana." On July 1, 1992, ARCO commented upon the State's April 1992 "Assessment Plan: Part II Clark Fork River Basin NPL Sites, Montana." As set forth in detail in ARCO's prior comments, and contrary to assertions in the Assessment Plan: Part III, the State -- from the very beginning of its assessment process -- has failed to conduct its assessment in accordance with the requirements of the Department of Interior's Natural Resource Damage Assessment Regulations, 43 C.F.R. Part 11 (the "NRDA Regulations"). Moreover, the State in planning and conducting its assessment has completely ignored the mandatory statutory limitations upon and exclusions to natural resource damages under CERCLA.

I. GENERAL COMMENTS

ARCO's prior comments, incorporated herein by reference, spell out the pervasive and fundamental flaws in the State's assessment process and will not be reiterated here. Rather than respond to

ARCO's comments and correct the deficiencies in its assessment process, the State carried these defects into the preparation of its Groundwater, Aquatics, and Terrestrial Resources Reports, its Compensable Damages Reports and its Restoration Report. ARCO provided the State with extensive critiques of these reports during the course of confidential settlement negotiations over the past year, again informing the State specifically how its assessment fails to comply with the NRDA Regulations. In accordance with the Memorandum of Understanding entered into between the parties, ARCO's submittals in response to the State's Resources Reports, Compensable Damages Reports and Restoration Report are confidential documents not to be disclosed.¹ Nevertheless, the State must consider ARCO's submittals. ARCO's submittals provided the State with yet another opportunity to overhaul its assessment process to correct the numerous and material flaws ARCO has identified to date.

Unfortunately, while the State's Assessment Plan: Part III implicitly recognizes certain deficiencies in the State's program, it falls far short of the major change in course necessary for the State to conduct its assessment in accordance with the NRDA Regulations. As a threshold matter, Part III focuses exclusively on aquatic resources. Thus, the gross and pervasive inadequacies

¹ ARCO in its sole discretion may elect to comment publicly upon the State's Resources Reports, Compensable Damages Reports and Restoration Report at any time. The State's issuance of these Reports does not relieve the State of its obligation to formulate a Restoration and Compensation Determination Plan (to the extent the State believes there is a legal basis for asserting restoration damages) for public comment as provided for under the NRDA Regulations or to otherwise provide review and public comment to the full extent provided for under the NRDA Regulations.

that ARCO has identified to date with respect to the State's assessment of terrestrial and groundwater resources remain unaddressed.

Additionally, the State seems intent on administering only to a few symptoms when its aquatics injury assessment is suffering from a fatal disease. Rather than undertaking the major surgery that is necessary for its aquatics injury assessment to comply with the NRDA Regulations and CERCLA, the State proposes in Part III to put a bandaid on the problem. Part III does not address, among other things:

- 1) The State's utter failure to consider the "wholly before 1980," "irreversible and irretrievable commitment" and "permitted release" statutory exclusions to natural resource damages liability under CERCLA, as mandated by CERCLA and the NRDA Regulations. See 42 U.S.C. §§ 107(f) and (j) of CERCLA and 43 C.F.R. § 11.24(b);
- 2) The State's failure to adequately consider the effect of completed or anticipated response actions as required by CERCLA and the NRDA Regulations;
- 3) The State's failure to define baseline in accordance with the NRDA Regulations, including without limitation the failure to incorporate within baseline: releases of hazardous substances from non-ARCO operations; naturally occurring releases; all other impacts upon aquatic resources from naturally occurring or anthropogenic factors; and the statutory exclusions to natural resource damages liability;

- 4) The State's flawed approach with respect to reference streams which fails to comply with the NRDA Regulations, makes no allowance for the significant differences in both microhabitat and anthropogenic activities which exist between the Clark Fork River and the "matched reference reaches" and essentially ignores the mandate to determine baseline for purposes of quantifying injury set forth in the NRDA Regulations;
- 5) The State's use of improper procedures and methodologies for determining and quantifying injury to aquatic resources, including without limitation its use of total metals rather than dissolved metals concentrations adjusted as appropriate with a water effects ratio for determining injury to surface water and its use and reliance upon flawed field and laboratory studies; and
- 6) The State's failure to identify and quantify injury in terms of services provided by the aquatics resource.

Instead of addressing these and other fundamental inadequacies in its aquatics resources assessment, the State proposes to patch only a few weaknesses. For example, ARCO has expressed concerns that snorkeling, as conducted by the State, may seriously underestimate fish populations in the Clark Fork River. The State proposes to compare snorkeling and electrofishing trout population estimation techniques, but still intends to use snorkeling to estimate fish population.

While some of the State's proposed tasks in Part III may be a step in the right direction, the State must go much further to have a valid basis to assert that it is conducting its assessment in

accordance with the NRDA Regulations and CERCLA's statutory framework. Specific comments on the Assessment Plan: Part III are provided below.

II. SPECIFIC COMMENTS

A. Section 3.0 - TROUT POPULATION SURVEYS

ARCO agrees that it is important to evaluate seasonal and annual influences on trout populations in the Clark Fork River. However, ARCO strongly contests the assertion that "[t]ROUT populations in the Clark Fork River were found to be substantially less than populations in reference streams." This erroneous conclusion is based, in part, upon the State's flawed reference stream approach for quantifying injury to trout. ARCO has criticized the State's reference stream approach extensively for its failure to comply with the NRDA Regulations and specifically for its failure to determine properly the baseline from which injury can be quantified.

As a threshold matter, the State has not justified its determination to proceed with its control area/reference stream approach as required by the NRDA Regulations. See 43 C.F.R. 11.72. The limited information the State has made publicly available regarding its reference stream approach shows that the State's approach does not meet the requirements for control area selection set forth in 43 C.F.R. 11.72(d)(1)-(7) and 11.72(g). Among other things, few of the State's control or reference streams are upstream to either Silver Bow Creek or the Clark Fork River, all are significantly dissimilar and not comparable to the Clark Fork River and Silver Bow Creek in both microhabitat and in anthropogenic activities that limit fish habitat and populations,

and there is no evidence that data on reference streams were collected over a period of time sufficient to estimate normal variability in the characteristics which were measured.

As examples of the many problems inherent in the State's reference stream approach and without limitation, the choice of reference streams used to represent baseline conditions for Silver Bow Creek is inappropriate because it ignores the considerable impact that the Butte sewage treatment facility has on Silver Bow Creek. Similarly, the choice of reference streams used for comparison to the Clark Fork River is inappropriate because it ignores the impact of the Butte and Deer Lodge sewage treatment plant discharges to the Clark Fork River. While the State asserts that comparisons made between test and reference sites were adjusted for differences in both physical and geomorphological characteristics, as well as land use activities unrelated to the alleged releases of hazardous substances, the only apparent adjustments were those pertaining to weighted usable area and flow, and the approach used to adjust these parameters was flawed.

Selection of reference streams did not consider density of tributary streams that may serve as sources of juvenile recruitment both to reference streams and to the mainstem (an important consideration for the Clark Fork River whose populations are likely linked directly to tributary streams). In matching test and reference stream sites, the State failed to account for the extensive irrigation withdrawals and dewatering impacts associated with the upper Clark Fork River and failed to consider differences in temperature regimes. The State has erroneously assumed that a channelized reach of a river can be approximated by a straight

reach of a stream that has not been channelized. Matchups of test and reference streams indicate that virtually all of the channelized test sites have been matched with straight unchannelized reference sites. The manner in which test and reference streams were matched does not allow separation of impacts related to alleged ARCO releases of hazardous substances from impacts caused by naturally occurring releases and other land use or anthropogenic activities. The State cannot rely upon such an unsound and invalid approach to quantify compensable injury to trout within the Clark Fork River or Silver Bow Creek.

The State's quantification of injury to trout populations is compounded by its reliance upon snorkeling to estimate trout populations. ARCO has stressed that electrofishing provides a more accurate estimate of fish populations in the Clark Fork River than does snorkeling. The fact that the State's own Department of Fish, Wildlife and Parks uses and has historically used electrofishing to estimate fish populations strongly supports this conclusion. Moreover, snorkeling efficiency diminishes with stream size, especially in the Clark Fork River where sampling conditions in channelized sections would be very difficult or where visibility is poor. Rather than changing course and conceding that snorkeling does not provide accurate estimates of seasonal or annual variations in trout populations in the Clark Fork River or "matched reference streams," the State intends to gather more data to estimate trout population using snorkeling. See Section 3.2 of Part III ("Trout populations are estimated by direct underwater observation (snorkeling)").

The State proposes to compare snorkeling and electrofishing methodologies in Section 3.2, Task 3. However, this task appears to be directed more at defending snorkeling than determining which methodology is most appropriate for accurately estimating fish populations. ARCO continues to believe that trout populations in the Clark Fork River should be estimated using the proven and generally accepted mark-recapture methodology. If the State proceeds with snorkeling, consideration should also be given to conducting the snorkeling surveys at night since studies have shown that fish may exhibit diurnal behavior shifts which may render them more susceptible to underwater observation at night rather than day. This may be especially true when sampling "cover oriented" species such as brown trout.

B. Section 4.0 - TEMPERATURE MONITORING

Temperature is an important factor to consider among many in determining non-metal impacts upon fish populations. ARCO supports any efforts by the State to include within baseline such other factors. The State should include monitoring the water temperature of Warm Springs Creek under this Task. Warm Springs Creek is an important tributary to the Clark Fork River. It is subject to irrigation withdrawals and is dewatered in its lower segments during the irrigation season.

C. Section 5.0 - DISSOLVED OXYGEN MONITORING

Dissolved oxygen ("DO") is another significant factor which impacts fish populations and must be included in baseline. Unfortunately, the State's DO proposal is deficient in a number of critical respects: 1) the task is limited to four alleged "reference" streams. The task should include DO monitoring on the

Clark Fork River and Silver Bow Creek; 2) the proposed program is not a "monitoring" program; rather it proposes instantaneous measurement of DO concentrations on one or two days rather than a long-term program which would document a chronic, recurring condition. The program will provide no information regarding the timing and duration of when DO excursions (i.e., drops in DO concentrations to levels which may impair trout survival) may occur and certainly is insufficient to provide a valid comparison between DO excursions in the Clark Fork River and Silver Bow Creek and the alleged "reference" streams. As proposed, this task will not provide sufficient data to determine the impact of DO on the Clark Fork River or Silver Bow Creek. Impacts of DO on fish populations are not attributable to ARCO and must be included in baseline.

D. Section 6.0 - ANALYSIS OF TROUT GUT CONTENTS

The State provides no explanation for why it proposes to analyze trout gut content or why it believes the Big Hole River is an appropriate "reference stream" for this work. Moreover, the State has not identified which standard methodologies the State intends to use for this analysis. The State must propose with more specificity what it intends to do and accomplish. Without further information, ARCO cannot meaningfully comment on this task. At this juncture, the proposed analysis of trout gut contents does not appear relevant to injury determination or quantification. Appropriate protocols must be employed to insure that studies of gut content identify only the bioavailable fraction of metal in the gut. Other data must also be collected in tandem with such studies. For example, to allow interpretation of gut content data,

age, size and condition of fish and characterization of the gut content must also be recorded.

E. Section 7.0 - COLLECTION OF SAMPLES FOR DISSOLVED ORGANIC CARBON

The State provides no explanation for why it proposes to analyze for dissolved organic carbon. Without an explanation of the purpose of this task, ARCO cannot meaningfully comment. TDS and total and dissolved metals concentrations should be obtained in concert with this effort. Although not apparent, if the intent of this effort is to evaluate the applicability and appropriateness of previous water effects ratio determinations for areas outside the range of the prior studies, the investigators should consider incorporation of empirical determination of toxicity. This is especially important since previous studies have shown poor correlations between dissolved organic carbon concentrations and water effects ratios. Without empirical data on toxicity, a consistent relationship between dissolved organic carbon and bioavailability cannot be established.

F. Section 8.0 - PERIPHYTON ANALYSIS OF RIFFLE ENVIRONMENTS

The State provides no explanation for why it believes the Big Hole River is an appropriate "reference stream" for this work. Moreover, the State has not identified which "standard methodologies" the State intends to use for this analysis. In particular, the State has not identified with specificity the MDHES methodology it may use. Thus, ARCO cannot meaningfully comment on this task.

III. REQUEST TO OBSERVE FIELD SURVEYS

43 C.F.R. 11.31(a)(4) provides that:

The Assessment Plan shall contain procedures or schedules for sharing data, split samples and results of analyses, when requested, with any identified potentially responsible parties and other natural resource trustees.

In accordance with the NRDA Regulations, ARCO hereby formally requests that, in addition to being provided data, split samples and analyses performed with respect to Part III of the State's Assessment, it be given a meaningful opportunity to observe all field survey activities. Specifically ARCO is requesting a minimum of 3 business days notice of the timing and location of all field survey activities.

IV. CONCLUSION

ARCO respectfully requests that the State revise its Assessment Plan in accordance with these comments and ARCO's prior comments. Unless the State incorporates ARCO's comments into its assessment process, the State's assessment will fail to comply with the NRDA Regulations and will provide no basis for determining or quantifying injury to natural resources.

